Altamont Pass Wind Resource Area Repowering

Final Program Environmental Impact Report

State Clearinghouse #2010082063

Prepared by Alameda County Community Development Agency
with technical assistance from ICF International

October 2014

ALTAMONT PASS WIND RESOURCE AREA REPOWERING FINAL PROGRAM ENVIRONMENTAL IMPACT REPORT

STATE CLEARINGHOUSE #2010082063

PREPARED BY:

Alameda County Community Development Agency
224 W. Winton Avenue, Room 111
Hayward, CA 94544
Contact: Sandra Rivera
510.670.5400

WITH TECHNICAL ASSISTANCE FROM:

ICF International
630 K Street, Suite 400
Sacramento, CA 95814
Contact: Sally Zeff
916.737.3000

October 2014

Alameda County Community Development Agency. 2014. *Altamont Pass Wind Resource Area Repowering Final Program Environmental Impact Report*. State Clearinghouse #2010082063. October. (ICF 00323.08.) Hayward, CA. With technical assistance from ICF International, Sacramento, CA.

Contents

Tables

Figures

Figures follow the chapter or section in which they are referenced

Acronyms and Abbreviations

°F	Fahrenheit
μg/m³	micrograms per cubic meter
AADT	annual average daily traffic
AB	Assembly Bill
ABAG	Association of Bay Area Governments
ACCWP	Alameda County Clean Water Program
ACDEH	Alameda County Department of Environmental Health
ACE	Altamont Corridor Express
ACFD	Alameda County Fire Department
ACHP	Advisory Council on Historic Preservation
ACWD	Alameda County Water District
ADC	Alternative Daily Cover
ADT	Average Daily Traffic
af	acre-feet
AFMT	Alameda County Avian Fatality Monitoring Team
Alquist-Priolo Act	Alquist-Priolo Earthquake Fault Zoning Act
ALUC	Airport Land Use Commission
ALUCP	Airport Land Use Compatibility Plan
ANSI/ASA	American National Standards Institute / American Standards Association
APE	area of potential effect
APLIC	Avian Power Line Interaction Committee
APP	Avian Protection Plan / Avian Protection Program
APWRA	Altamont Pass Wind Resource Area
ARB	California Air Resources Board
AST	aboveground storage tank
ASTM	American Society of Testing and Materials
Audubon	Golden Gate Audubon Society
AWI	Altamont Winds Inc.
AWPPS	Avian Wildlife Protection Program and Schedule
AWT	airborne wind turbines
BAAQMD	Bay Area Air Quality Management District
BAAQMD Guidelines	Bay Area Air Quality Management District California Environmental Quality Act Air Quality Guidelines
BACTs	Best Available Control Technologies
basin plans	water quality control plans
BBCS	Bird and Bat Conservation Strategy
BBS	Breeding Bird Survey
BCC	birds of conservation concern

Bethany Reservoir	Bethany Reservoir State Recreation Area
BGEPA	Bald and Golden Eagle Protection Act
BMPs	best management practices
BOS	Board of Supervisors
BRMP	Biological Resources Management Plan
Buena Vista	Buena Vista repowering project
C&D	construction and demolition
CAA	Clean Air Act
CAAA	Clean Air Act amendments
CAAQS	California Ambient Air Quality Standards
CAFE	Corporate Average Fuel Economy
CAL FIRE	California Department of Forestry and Fire Protection
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
Cal-OSHA	California Division of Occupational Safety and Health
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARE	Californians for Renewable Energy
CBC	California Building Code
CBD	Center for Biological Diversity
CBSC	California Building Standards Code
CCAA	California Clean Air Act
CCAP	Climate Action Plan
CCAs	Community Choice Aggregations
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CGS	California Geological Survey
CH_4	methane
CHP	California Highway Patrol
CHRH	California Register of Historic Resources
CHRIS	California Historical Resources Information System
CMA	Congestion Management Agency
CMP	Congestion Management Program
CNDDB	California Natural Diversity Database
CNEL	community noise equivalent level
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent

COD	commercial operation date
Construction General Permit	NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ)
County	Alameda County
CPUC	California Public Utilities Commission
CR	Climate Registry
CTC	Alameda County Transportation Commission
CUP	conditional use permit
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
CWTP	Countywide Transportation Plan
dB	decibel
dBA	A-Weighted Decibel
Delta	San Joaquin–Sacramento Delta
Diablo Winds	Diablo Winds repowering project
DOC	California Department of Conservation
DPM	diesel particulate matter
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources
EACCS or Conservation Strategy	East Alameda County Conservation Strategy
EBRPD	East Bay Regional Park District / East Bay Recreation and Parks District
EBZA	East County Board of Zoning Adjustments
ECAP	East County Area Plan
EDF RE	EDF Renewable Energy / enXco
EIR	environmental impact report
EMFAC	EMission FACtors
EMT	Middle Period Transition
EPA	U.S. Environmental Protection Agency
EPC	Engineering Procurement and Construction
ESA	Endangered Species Act
ESPs	energy service providers
FAA	Federal Aviation Administration
FAR	floor area ratio
Farmland	Prime Farmland, Unique Farmland, or Farmland of Statewide Importance
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FMMP	Farmland Mapping and Monitoring Program
FY	fiscal year
General Industrial Permit, General Construction Permit	NPDES General Permit for Storm Water Discharges

GHG	greenhouse gas
GLO	General Land Office
Golden Hills	Golden Hills Wind, LLC
Golden Hills Project	Golden Hills Wind Energy Facility Repowering Project
GVWR	gross vehicle weight rating
GWP	global warming potential
GWR	gross vehicle weight rating
H&S	Health and Safety
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HALS	Historic American Landscapes Survey
HAPs	hazardous air pollutants
HCD	California Department of Housing and Community Development
HCP	habitat conservation plan
HDD	horizontal directional drilling
HFC	hydrofluorocarbons
HI	hazard index
HMBP	Hazardous Materials Business Plan
HRA	Health Risk Assessment
HSC	California Health and Safety Code
Hz	Hertz
I-	Interstate
IBC	International Building Code
IOU	investor-owned utilities
IPCC	Intergovernmental Panel on Climate Change
ISO	International Standard Organization
kV	kilovolt
kW	kilowatt
LARPD	Livermore Area Recreation and Park District
lbs	pounds
LCFS	low carbon fuel standard
LDAR	leak detection and repair
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
LID	Low impact development
L_{max}	Maximum Sound Level
L_{min}	Minimum Sound Level
LOS	level of service
LPA	Large Parcel Agriculture
LPFD	Livermore/Pleasanton Fire Department

LSAA	Lake and Streambed Alteration Agreement
L_{XX}	Percentile-Exceeded Sound Level
m/s	meters/second
Master Plan	East Bay Regional Park District Master Plan
MBTA	Migratory Bird Treaty Act
mg/L	milligrams per liter
MMRP	mitigation monitoring and reporting program
mph	miles per hour
MPOs	metropolitan planning organizations
MRZ	Mineral Resource Zone
msl	mean sea level
MTS	Metropolitan Transportation System
MW	megawatt
MWh/year	megawatt-hours per year
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCCP	Natural Community Conservation Plan
NEPA	National Environmental Policy Act
NextEra	NextEra Energy, LLC
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NMFS	National Marine Fisheries Service
NO	nitric oxide
NO_2	nitrogen dioxide
NOI	notice of intent
NOP	Notice of Preparation
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NWIC	Northwest Information Center
O&M	Operations and maintenance
O_3	Ozone
OEHHA	Office of Environmental Health Hazard Assessment
OHP	California Office of Historic Preservation
OHWM	ordinary high water mark
Open Space Element	Open Space Element of the General Plan
Ozone Plan	Bay Area 2001 Ozone Attainment Plan
P-C	Production-Consumption
Patterson Pass	Patterson Pass Wind Farm, LLC

Patterson Pass Project	Patterson Pass Wind Farm Repowering Project
Pb	lead
PCBs	polychlorinated biphenyls
PEIR	Program Environmental Impact Report
PFC	perfluorinated carbons
PG&E	Pacific Gas and Electric Company
Phase I ESA	Phase I Environmental Site Assessment Process
PM	particulate matter
PM10	Respirable particulate matter
Porter-Cologne Act	Porter-Cologne Water Quality Control Act of 1969
ppb	parts per billion
pphm	parts per hundred million
ppm	parts per million
ppt	parts per trillion
PPV	Peak Particle Velocity
PRC	Public Resources Code
PRDs	Permit Registration Documents
Program	Altamont Wind Resource Area Repowering Program
Programmatic BO	Programmatic Biological Opinion for the East Alameda County Conservation Strategy
PSD	Prevention of Significant Deterioration
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act of 1976
REA	Resource Equivalency Analysis
Regional Water Boards	Regional Water Quality Control Boards
Reporting Rule	Greenhouse Gas Reporting Rule
RHNA	Regional Housing Need Assessment
ROG	reactive organic gases
RPS	Renewables Portfolio Standard
RTPs	Regional Transportation Plans
RWQCB	Regional Water Quality Control Board
SB	Senate Bills
SCAQMD	South Coast Air Quality Management District
Scenic Route Element	Scenic Route Element of the Alameda County General Plan
SCS	sustainable communities strategy
SF_6	sulfur hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SHPO	State Historic Preservation Officer
SIP	state implementation plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District

SMARA	Surface Mining and Reclamation Act of 1975
SMARTS	Storm water Multiple Application and Report Tracking System
SO_2	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasures
SR	State Route
SRAs	state responsibility areas
SRC	Scientific Review Committee
State Water Board	State Water Resources Control Board
SVP	Society of Vertebrate Paleontology
SWPPP	stormwater pollution prevention plan
TAC	technical advisory committee
TACs	toxic air containments
TCMs	traffic control measures
TCP	Traffic Control Plan
TDM	Transportation Demand Management
TDS	total dissolved solids
TMDL	total maximum daily load
TNM	traffic noise model
TRFD	Tracy Rural Fire Department
UCMP	University of California Museum of Paleontology
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
Vasco Winds	Vasco Winds repowering project
VAWT	vertical axis wind turbine
VMT	vehicle miles traveled
VOC	volatile organic compounds
WDRs	waste discharge requirements
WECS	Wind Energy Conversion Systems

Executive Summary

This Program Environmental Impact Report (PEIR) has been prepared in accordance with the provisions of the California Environmental Quality Act (CEQA) to evaluate the potential impacts of repowering the Alameda County portion of the Altamont Pass Wind Resources Area (APWRA), including two individual wind energy repowering projects: the Golden Hills Wind Energy Facility Repowering Project (Golden Hills Project), and the Patterson Pass Wind Farm Repowering Project (Patterson Pass Project). The PEIR is intended to identify the anticipated environmental impacts of conditional use permits (CUPs) that may be approved by Alameda County (County) for repowering windfarm projects in the Alameda County portion of the APWRA—a modified boundary of which is hereafter referred to as the *program area*—through 2018 and beyond: both those currently proposed—the individual projects—and those expected to be proposed (collectively, the *program* addressed in this PEIR).

This PEIR is intended to enable the County to comply with CEQA in approving the Golden Hills and Patterson Pass Projects described in this PEIR, as well as to provide a basis for the preparation of CEQA documentation and review of applications for subsequent wind repowering projects. The County is the CEQA Lead Agency for the proposed and anticipated subsequent CUPs. This PEIR is the first tier of environmental documentation, providing program-level analysis of the complete repowering of the program area with new turbines, and project-level analysis of the two repowering projects. This analysis will be augmented or supplemented by second-tier environmental documents as appropriate when additional details for other specific repowering projects are developed.

The proposed and anticipated subsequent repowering projects that are evaluated in this PEIR would be located in eastern Alameda County, California. As required by Section 15123 of the State CEQA Guidelines, this Executive Summary contains the following.

- A brief summary of the proposed actions (wind repowering CUPS), including goals and objectives.
- Significant impacts and proposed mitigation measures.
- Alternatives that would reduce or avoid identified significant effects.
- Areas of controversy known to the Lead Agency, including issues raised by agencies and the public.
- Issues to be resolved.

ES.1 Summary of Proposed Wind Repowering CUPs

ES.1.1 Program/Project Location

The APWRA is an approximately 50,000-acre area that extends across the northeastern hills of Alameda County and into a small portion of Contra Costa County to the north (Figure 1-1). As noted above, this PEIR covers projects proposed in and around the Alameda County portion of the APWRA. The County will consider applications within the revised APWRA boundary that was established through an early phase of developing a Natural Communities Conservation Plan/Habitat

Conservation Plan (NCCP/HCP) in Alameda County (i.e., the program area). The program area assessed in this PEIR encompasses 43,358 acres (Figures 1-2 and 1-3).

ES.1.2 Background

The APWRA has supported numerous wind energy projects operated by numerous companies since the 1980s, after the State of California designated the area for production of renewable energy (in 1980) based on federal legislation passed in 1978 to achieve a range of renewable energy, source diversity, and market goals. The result of the designation was the development of a vast array of windfarms in the APWRA that was the largest of its kind in the United States by the mid-1990s.

In general, the current operating facilities consist of *old generation* turbines with limited electrical generation capacity (i.e., up to 300 kilovolts [kV]). With some exceptions, these projects can operate under the provisions of their existing CUPs until September 2018, at which time the operators would either apply to renew their CUPs, or the CUPs would expire. The wind operators intend to repower these projects—that is, remove the old generation turbines and replace them with modern, state-of-the-art turbines with generation capacities ranging up to 3 megawatts (MW).

Three wind operators are also subject to the requirements of the 2007 Settlement Agreement with two nongovernmental environmental advocacy organizations—the Golden Gate Audubon Society (Audubon) and Californians for Renewable Energy (CARE)—and with Alameda County. The Settlement Agreement required certain steps to be taken to reduce mortality of four focal raptor species (i.e., golden eagle, red-tailed hawk, American kestrel, and western burrowing owl), including the development of an NCCP or similar agreement as provided for under the California Fish and Game Code. Accordingly, the County began developing an NCCP/HCP in 2008, but in 2010 the largest operator (NextEra Energy Resources) reached a new and separate agreement with Audubon, CARE, and the state Attorney General regarding repowering its wind power assets. The 2010 agreement did not affect the requirement for an NCCP or similar agreement; but, in effect, the County and the companies shifted their focus to establishing mitigation measures for wind repowering that would apply to future projects and that would address the same issues. Preparation of a program EIR covering the anticipated repowering of the whole of the program area was chosen as the method to accomplish this.

ES.1.3 Anticipated Environmental Benefits

Repowering is anticipated to result in an array of environmental benefits. New technology, the substantial reduction in the number of turbines, and the undergrounding of electrical collection lines are expected to reduce the number of avian fatalities associated with the repowered facilities. Similarly, the more widely distributed facilities, in conjunction with the potential to decommission existing facilities, could facilitate habitat enhancement and a reduction in habitat fragmentation. New roads would be designed to more effectively protect surface water quality, and compensatory mitigation proposed in this PEIR would contribute to landscape-level conservation efforts both within the program area and in the wider eco-region.

The new turbines, while larger, would detract from views less from a viewer standpoint than do the numerous old-generation turbines, allowing for more prominent view of the rolling, grassy terrain of the program area.

New turbine design and technology would result in reduced fire hazard associated with hardware and electrical line failure and bird electrocution incidents. The reduced number of turbines and safety features incorporated into rotor design would reduce the risk of blade throw.

Fourth-generation turbines, being upwind turbines with relatively low rotational speeds and pitch control on the rotor blades, typically generate lower sound levels than the first- and second-generation turbines they are replacing.

ES.1.4 Program- and Project-Level Analysis

In compliance with the directive provided in the 2005 CUPs and the 2007 Settlement Agreement, the program as defined in this PEIR has three separate but related components.

- The "continued operation of existing turbine facilities (and progressive removal under the repowering program)" as described in the 2007 Settlement Agreement and as permitted under the 2005 CUPs (described in Section 2.4).
- The anticipated approval of new CUPs to allow repowering of wind turbines in the Alameda County portion of the APWRA (described in Section 2.5).
- Two specific repowering proposals: the Golden Hills Project and the Patterson Pass Project (described in Section 2.6).

This document is designed to provide both program-level analysis of repowering of the APWRA, providing a framework for area-wide analysis, and project-level analysis of the two permit applications for specific repowering projects in the program area that have been submitted to the County.

- The Golden Hills Project, proposed by Golden Hills Wind, LLC (a subsidiary of NextEra Energy Resources, LLC).
- The Patterson Pass Project, proposed by EDF Renewable Energy (EDF RE—formerly known as enXco) through its operating subsidiary Patterson Pass Wind, LLC.

The Golden Hills and Patterson Pass Projects are independent wind energy repowering projects that the County has chosen to analyze in this combined program/project EIR at a project level, together with a program-level analysis of the overall repowering of all the anticipated projects, including those for which specific applications have not yet been submitted. The project-level analyses will enable the specific projects to be approved separately from each other and from other repowering proposals. Their approval is not dependent on the approval of any other repowering project, and the approval of either will not cause the repowering of any other project. However, it is anticipated that these independent projects will substantially conform to repowering standards as described in this PEIR.

ES.1.5 Program Description

The program is the anticipated approval by the County of new CUPs to allow new windfarm uses in the APWRA, as permitted by the *East County Area Plan* (ECAP) and conditionally permitted in the County Zoning Ordinance. Windfarm uses are conditionally permitted in the "A" (Agriculture) zone district, which encompasses the entire program area, and in areas designated under the ECAP as Large Parcel Agriculture (LPA), which applies to almost all of the program area. As a program EIR, this document analyzes a series of actions that are related geographically and that are likely to have similar environmental effects that can be mitigated in similar ways (see State CEQA Guidelines Section 15168[a]). The series of actions—anticipated approvals of a series of CUPs—will result in progressive repowering of the APWRA: decommissioning of existing old-generation turbines, installation of new turbines, and operation for the expected life of the new turbines under a 30-year permit and conditions of approval that include implementation of the identified mitigation measures. When approving new CUPs for repowering, the County intends to facilitate such repowering projects through reliance on the mitigation measures contained in this PEIR as uniform standards where appropriate and by tiering from this PEIR to provide a framework for an area-wide analysis.

Two program alternatives for repowering of the APWRA have been identified for detailed analysis in this PEIR: Alternative 1, under which a maximum capacity of 417 MW in combined nameplate capacity would be developed; and Alternative 2, with a maximum capacity of 450 MW, which is being considered to serve the objective of increasing the output of clean energy and meeting state energy portfolio goals, in light of evidence that the current generation of wind turbines can greatly reduce avian mortality. With the exception of the nameplate capacity and the estimated difference in the total number of turbines (i.e., approximately 260 turbines under Alternative 1 and 281 under Alternative 2), the two alternatives are identical in the context of the description presented below.

The description in this PEIR of the proposed program addresses the components listed below.

Repowering Timeline

Once CEQA compliance is completed and new CUPs are approved, buildout of repowered windfarms is expected to take place over a 4-year period. CUPs will be issued for a period of 30 years.

Repowering Activities

A repowering project typically includes the following major steps.

- Temporary meteorological tower installation.
- Temporary staging area set-up.
- Existing wind turbine removal.
- Temporary meteorological tower removal.
- Road infrastructure upgrades.
- Wind turbine construction.
    - Final site selection and preparation.
    - Batch plant construction.
    - Foundation excavation and construction.
    - Crane pad construction.
    - Tower assembly.
    - Installation of turbine nacelle.
    - Attachment of rotors.
- Collection system upgrades and installation.

- Communication system installation.
- Permanent meteorological tower installation.
- Reclamation of landscape.

Operations and Maintenance (O&M) Activities

Turbines would be operated in accordance with manufacturer recommendations and avoidance and minimization measures set forth in this PEIR. Seasonal shutdown of individual turbines may be required as an adaptive management action, but only if impacts on avian species are higher than anticipated in the estimates presented in this PEIR (Section 3.4, *Biological Resources*). Repowered turbines, once installed, would not be permanently shut down or decommissioned prior to the end of the permit term, proposed for a 30-year period.

Maintenance activities would consist of equipment replacement, collection system repair, and road maintenance as necessary.

ES.1.6 Project Descriptions

Golden Hills

Golden Hills proposes to repower an existing wind energy facility in the program area with new-generation turbines, pursuant to the *2010 Agreement to Repower Turbines in the Altamont Pass Wind Resource Area* (see Section 2.6.1). The proposed Golden Hills Wind Energy Facility Repowering Project (Golden Hills Project) would decommission and remove 775 existing wind turbines on the site, install up to 52 new 1.7 MW GE turbines, make improvements to related infrastructure, and yield a nameplate capacity of 88.4 MW. The project site encompasses 38 separate parcels on more than 4,500 acres, on which there are seven CUPs currently in effect.

Patterson Pass

The Patterson Pass Project would entail repowering of the existing 21.8 MW windfarm, permitted under CUP C-8263, ENXCO, Inc. / Patterson Pass Farms, owned by Patterson Pass Wind Farm, LLC, an operating subsidiary of EDF Renewable Energy (EDF RE). The existing windfarm originally comprised 336 Nordtank and Bonus 65 kW turbines, of which 317 turbines remain operational. The repowered project would consist of 8–12 turbines with a total nameplate capacity of 19.8 MW. The site consists of three parcels encompassing 952 acres.

ES.2 APWRA Repowering Objectives

The two primary objectives of the County in considering applications for repowering in the program area are to facilitate efficient wind energy production through repowering and to avoid and minimize impacts on terrestrial and avian wildlife caused by repowered wind turbine construction, operation, and maintenance. The County's specific objectives are listed below.

- Allow for appropriate and compatible repowering and operation of wind turbines consistent with existing repowering timeline requirements set forth in the 2005 CUPs (as amended in 2007), related agreements, and project-specific power purchase agreements.

- Reduce avian mortality caused by wind energy generation in the program area through repowering.
- Meet the County's goals to provide environmentally sensitive, clean-renewable wind energy for the twenty-first century as identified in the *East County Area Plan* (Policies 168 through 175 and Programs 73 through 76).
- Help meet the Governor's Executive Order S-14-08 in meeting the Renewable Portfolio Standard target that all retail sellers of electricity serve 33% of their load with renewable energy by 2020.
- Contribute to state progress toward air quality improvement and greenhouse gas emission reduction goals, as set forth in Assembly Bill 32.
- Improve habitat quality in the program area through removal of roads and existing wind turbines and their supporting infrastructure, resulting in lower overall operational footprint, and providing a wide range of habitat benefits to sensitive terrestrial and avian species.

ES.3 Project Objectives

ES.3.1 Golden Hills Project

As recognized by the County, the proposed Golden Hills Project would serve the public and market need for electrical energy, the documented and public policy need to produce renewable energy, and the widely held public and regulatory agency need to substantially reduce avian mortality related to wind turbine operations. The goals of the applicant are to repower its windfarm assets in compliance with the existing CUPs and applicable laws, reduce avian mortality, and meet County general plan and state goals for production of renewable energy.

The applicant's objectives for the proposed project include implementation of provisions of the 2010 *Agreement to Repower Turbines at the Altamont Pass Wind Resource Area*. Consistent with that agreement, Golden Hills intends to replace approximately 2,400 turbines between 2010 and 2014, and will shut down all its existing turbines no later than 2015. Golden Hills' objective over 4 years is to replace its estimated 160 MW of generating capacity in two phases, beginning with the 88.4 Golden Hills Phase 1 Project, which is the project addressed in this PEIR. Golden Hills Phase 2 will be evaluated in a separate CEQA document. The 2010 Agreement was in part intended to satisfy NextEra's obligations under the 2007 Settlement Agreement.

ES.3.2 Patterson Pass Project

The Patterson Pass Project objective is to repower the existing Patterson Pass Wind Farm on private land owned by EDF RE and develop a 19.8 MW commercially viable wind energy facility that would deliver renewable energy to the power grid to meet the state's RPS goals. Patterson Pass Wind, LLC and its parent company EDF RE were party to the 2007 Settlement Agreement described above; the proposed repowering would fulfill EDF RE's obligations under that agreement.

ES.4 Impacts and Mitigation Measures

ES.4.1 Summary of Impacts

Impacts identified in this PEIR are summarized in Table ES-1 (presented at the end of this summary). For potentially significant impacts, mitigation measures are identified where feasible to reduce the impact on the environmental resources to a less-than-significant level. Refer to Chapter 3, *Impact Analysis*, for a detailed discussion of impacts and detailed description of the mitigation measures.

Overall, either of the two program alternatives considered in this PEIR would have a range of impacts, most of which could be reduced to less-than-significant levels with mitigation measures identified in this PEIR. Three specific impact areas were found to be significant even with mitigation, leaving these impacts significant and unavoidable. Significant and unavoidable impacts are related to turbine operational impacts on birds and bats; air quality impacts, both at the program level and cumulatively; and cumulative traffic impacts during windfarm construction.

Impacts resulting from construction and operation of the two specific projects considered in this PEIR would be similar to those identified for the program alternatives, with unavoidable operational impacts on birds and bats and construction-related air quality impacts.

Mitigation measures identified include both standard construction measures, such as compliance with NPDES requirements, and site-specific measures to avoid identified significant impacts on resources, including avoidance of a small area of prime farmland, avoidance of adverse effects on views from an undeveloped portion of a scenic roadway, and avoidance of known or unknown cultural resources. Mitigation measures for biological resources were developed to be consistent with the East Alameda County Conservation Strategy and the Settlement Agreements.

ES.4.2 Significant and Unavoidable Impacts

Section 21067 of CEQA and Sections 15126(b) and 15126.2(b) of the State CEQA Guidelines require that an EIR describe any significant impacts, including those that can be mitigated but not reduced to a less-than-significant level. Furthermore, where there are impacts that cannot be alleviated without imposing an alternative design, their implications and the reasons why the project is being proposed, notwithstanding their effect, should also be described. This PEIR has identified the following significant and unavoidable impacts.

- **Air Quality:** Construction emissions of reactive organic gases (ROG) and nitrogen oxides (NO_x) for program Alternatives 1 and 2 would exceed the BAAQMD thresholds after implementation of Mitigation Measures AQ-1 and AQ-2 (Table 3.3-11); accordingly, cumulative construction impacts would be significant and unavoidable. For the Golden Hills and the Patterson Pass Projects individually, construction emissions of NO_x would exceed the BAAQMD thresholds after implementation of Mitigation Measures AQ-1 and AQ-2 (Tables 3.3-16 and 3.3-21); accordingly, cumulative construction impacts would be significant and unavoidable.
- **Biological Resources:** Operation of either of the program alternatives, as well as the Golden Hills and Patterson Pass Projects considered separately, would result in turbine-related mortality of raptors, other birds, and bats migrating through and wintering in the program area.

Although mitigation can reduce these impacts, the likelihood of ongoing turbine-related mortality would constitute a significant and unavoidable impact.

- **Cumulative Traffic Impacts:** Cumulative impacts on traffic operation, safety hazards, emergency access, and bicycle facilities could result from program and project construction activities if they take place concurrently with construction of the Sand Hill Repowering Project, which has been identified as resulting in a significant and unavoidable traffic impact.

ES.5 Alternatives

ES.5.1 Alternatives Evaluated

Two program alternatives were considered at an equal level in this PEIR.

- Program Alternative 1, with a maximum capacity of 417 MW.
- Program Alternative 2, with a maximum capacity of 450 MW.

With the exception of the nameplate capacity and the resultant total number of turbines (i.e., a maximum of approximately 260 turbines under Alternative 1 and 281 turbines under Alternative 2), these two alternatives are identical.

Several other alternatives were considered at a comparative level. Chapter 4 presents the alternatives screening process and the results of the analysis. In addition to the two alternatives described above, the following five alternatives were evaluated.

- No Project—No Repowering, Reauthorization of Existing CUPs
- No Repowering—Full Decommissioning
- Fewer New Turbines
- Avoid Specific Biologically Sensitive / Constrained Areas
- No New Roads

ES.5.2 Comparison of Alternatives

The impacts of program Alternatives 1 and 2 were found to be very similar. Because turbines were assumed to be installed in projects consistent with the size typically proposed, approximately 80 MW per project, construction on a daily and seasonal basis would be the same. Because the number of turbines associated with program Alternative 2 would be only 21 more than that associated with program Alternative 1, the additional construction period would not be much longer than under Alternative 1. Therefore, impacts related to construction, such as air emissions and traffic, would be the same.

Because program Alternative 2 would result in the construction of more turbines, generating more power, that alternative would have a greater impact related to bird and bat mortality, an impact found to be significant and unavoidable under all alternatives with the exception of the No Project alternative. Other impacts that may be higher under program Alternative 2 than under program Alternative 1, such as impacts related to cultural or paleontological resources, visual resources, or impacts related to erosion, could all be reduced to a less-than-significant level by the same mitigation measures as those provided for program Alternative 1.

For the other alternatives considered at a comparative level, Table 4-2 presents a summary matrix of the program impacts in comparison with the five alternatives.

No feasible alternatives would reduce the significant and unavoidable impacts of the project to a less-than-significant level. Of all of the alternatives evaluated, the No Project - No Repowering, Reauthorization of Existing CUPs alternative would have greater impacts on birds and bats, as older models of turbines would not be replaced with models that reduce bird and bat mortality. The Fewer New Turbines alternative would reduce overall impacts slightly, with the exception of GHG. GHG impacts would be greater, because the benefits of full repowering would be reduced. The No New Roads alternative would reduce impacts associated with grading and road construction but would substantially increase impacts related to air emissions and GHG, because helicopters would be used for construction. The Avoid Specific Biologically Sensitive / Constrained Areas alternative would have the same impacts of either of the program alternatives, and could be implemented at either the 417MW or 450MW level, but would reduce the significant impacts associated with disturbance of biological resources at specific geographic locations. These impacts are not significant and unavoidable, as they can be reduced to a less-than-significant level by feasible mitigation measures identified in this EIR, but the impacts would be avoided under the Avoid Specific Biologically Sensitive / Constrained Areas alternative.

ES.5.3 Environmentally Superior Alternative

As described in more detail in Chapter 4, the No Project—No Repowering, Reauthorization of Existing CUPs alternative would have greater impacts on birds and bats, as older models of turbines would not be replaced with models that reduce bird and bat mortality. The Fewer New Turbines alternative would reduce overall impacts slightly, with the exception of GHG emissions. GHG impacts would be greater, as the benefits of full repowering would be reduced. The No New Roads alternative would reduce impacts associated with grading and road construction but would substantially increase impacts related to air pollutant and GHG emissions, as helicopters would be used for construction. The Avoid Specific Biologically Sensitive / Constrained Areas alternative would have the same impacts as either program alternative and could be implemented at either the 417 MW or 450 MW level, but would reduce the significant impacts associated with disturbance of biological resources at specific geographic locations. These impacts are not significant and unavoidable, as they can be reduced to a less-than-significant level by feasible mitigation measures identified in this EIR, but the impacts would be avoided under the Avoid Specific Biologically Sensitive / Constrained Areas alternative.

As described in more detail in Chapter 4, the No Repowering, Full Decommissioning alternative would have the least environmental impacts of all of the alternatives analyzed. For this reason, it would be the environmentally superior alternative.

ES.6 Potential Areas of Controversy/Issues to be Resolved

The areas of controversy and issues to be resolved concerning operation of wind turbines in the APWRA and concerning repowering that have been expressed in the past are listed below. These items are addressed in this EIR.

- The environmental impacts of the repowering program.
- The effectiveness of the various strategies to reduce and minimize avian mortality and other adverse impacts on wildlife (e.g., new wind turbine technology, site-specific measures, grazing management, conservation strategies).
- The benefit of repowering as a means of substantially and significantly reducing the amount of avian injury and mortality resulting from most existing types of turbines.
- The appropriate means of ensuring that repowered turbines have the lowest possible rate of avian mortality.
- How to provide incentives for an increased rate of repowering, including expanding areas where wind power facilities may be permitted.

ES.7 Comments on the Draft PEIR

The Draft PEIR was released for a 45-day public review period from June 6, 2014, to 5 p.m. July 21, 2014, and circulated to state agencies for review through the State Clearinghouse of the Governor's Office of Planning and Research. Comments on the Draft PEIR were due to the County no later than 5 p.m. on July 21, 2014, and could be forwarded by any of the following methods.

Mail: Sandra Rivera
Assistant Planning Director
224 W. Winton, Room 111
Hayward, CA 94544

Email: Sandra.Rivera@acgov.org

Fax: 510-785-8793

A public meeting was held at 1:30 p.m. on June 26, 2014, in the City of Pleasanton Council Chambers, at a meeting of the East County Board of Zoning Adjustments, 200 Old Bernal Avenue, Pleasanton. Comments on the Draft PEIR were received during the regularly scheduled meeting.

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Aesthetics			
AES-1a-1: Temporary visual impacts caused by construction activities—program Alternative 1: 417 MW	S	AES-1: Limit construction to daylight hours	LTS
AES-1a-2: Temporary visual impacts caused by construction activities—program Alternative 2: 450 MW	S	AES-1: Limit construction to daylight hours	LTS
AES-1b: Temporary visual impacts caused by construction activities—Golden Hills Project	S	AES-1: Limit construction to daylight hours	LTS
AES-1c: Temporary visual impacts caused by construction activities—Patterson Pass Project	S	AES-1: Limit construction to daylight hours	LTS
AES-2a-1: Have a substantial adverse effect on a scenic vista—program Alternative 1: 417 MW	S	AES-2a: Require site development review	LTS
		AES-2b: Maintain site free of debris and restore abandoned roadways	
		AES-2c: Screen surplus parts and materials	
AES-2a-2: Have a substantial adverse effect on a scenic vista—program Alternative 2: 450 MW	S	AES-2a: Require site development review	LTS
		AES-2b: Maintain site free of debris and restore abandoned roadways	
		AES-2c: Screen surplus parts and materials	
AES-2b: Have a substantial adverse effect on a scenic vista—Golden Hills Project	LTS		LTS
AES-2c: Have a substantial adverse effect on a scenic vista—Patterson Pass Project	LTS		LTS
AES-3a-1: Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings along a scenic highway—program Alternative 1: 417 MW	S	AES-2a: Require site development review	LTS
		AES-2b: Maintain site free of debris and restore abandoned roadways	
		AES-2c: Screen surplus parts and materials	
		AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
AES-3a-2: Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings along a scenic highway—program Alternative 2: 450 MW	S	AES-2a: Require site development review	LTS
		AES-2b: Maintain site free of debris and restore abandoned roadways	
		AES-2c: Screen surplus parts and materials	
		AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road	
AES-3b: Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings along a scenic highway—Golden Hills Project	S	AES-2a: Require site development review	LTS
		AES-2b: Maintain site free of debris and restore abandoned roadways	
		AES-2c: Screen surplus parts and materials	
		AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road	
AES-3c: Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings along a scenic highway—Patterson Pass Project	LTS		LTS
AES-4a-1: Substantially degrade the existing visual character or quality of the site and its surroundings—program Alternative 1: 417 MW	S	AES-2a: Require site development review	LTS
		AES-2b: Maintain site free of debris and restore abandoned roadways	
		AES-2c: Screen surplus parts and materials	
		AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road	
AES-4a-2: Substantially degrade the existing visual character or quality of the site and its surroundings—program Alternative 2: 450 MW	S	AES-2a: Require site development review	LTS
		AES-2b: Maintain site free of debris and restore abandoned roadways	
		AES-2c: Screen surplus parts and materials	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road	
AES-4b: Substantially degrade the existing visual character or quality of the site and its surroundings—Golden Hills Project	S	AES-2a: Require site development review	LTS
		AES-2b: Maintain site free of debris and restore abandoned roadways	
		AES-2c: Screen surplus parts and materials	
		AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road	
AES-4c: Substantially degrade the existing visual character or quality of the site and its surroundings—Patterson Pass Project	S	AES-2a: Require site development review	LTS
		AES-2b: Maintain site free of debris and restore abandoned roadways	
		AES-2c: Screen surplus parts and materials	
AES-5a-1: Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area—program Alternative 1: 417 MW	S	AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker	LTS
AES-5a-2: Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area—program Alternative 2: 450 MW	S	AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker	LTS
AES-5b: Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area—Golden Hills Project	S	AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker	LTS
AES-5c: Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area—Patterson Pass Project	S	AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker	LTS
AES-6a-1: Consistency with state and local policies—program Alternative 1: 417 MW	S	AES-2a: Require site development review	LTS
		AES-2b: Maintain site free of debris and restore abandoned roadways	
		AES-2c: Screen surplus parts and materials	
		AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker	
AES-6a-2: Consistency with state and local policies—program Alternative 2: 450 MW	S	AES-2a: Require site development review	LTS
		AES-2b: Maintain site free of debris and restore abandoned roadways	
		AES-2c: Screen surplus parts and materials	
		AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road	
		AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker	
AES-6b: Consistency with state and local policies— Golden Hills Project	S	AES-2a: Require site development review	LTS
		AES-2b: Maintain site free of debris and restore abandoned roadways	
		AES-2c: Screen surplus parts and materials	
		AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road	
		AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker	
AES-6c: Consistency with state and local policies—Patterson Pass Project	S	AES-2a: Require site development review	LTS
		AES-2b: Maintain site free of debris and restore abandoned roadways	
		AES-2c: Screen surplus parts and materials	
		AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road	
		AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Agricultural and Forestry Resources			
AG-1a-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use—program Alternative 1: 417 MW	S	AG-1: Avoid conversion of Prime Farmland	LTS
AG-1a-2: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use—program Alternative 2: 450 MW	S	AG-1: Avoid conversion of Prime Farmland	LTS
AG-1b: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use—Golden Hills Project	NI		
AG-1c: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use—Patterson Pass Project	NI		
AG-2a-1: Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract—program Alternative 1: 417 MW	NI		
AG-2a-2: Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract—program Alternative 2: 450 MW	NI		
AG-2b: Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract—Golden Hills Project	NI		
AG-2c: Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract—Patterson Pass Project	NI		
AG-3a-1: Conflict with existing zoning for, or cause rezoning of forest land, timberland, or timberland zoned Timberland Production—program Alternative 1: 417 MW	NI		
AG-3a-2: Conflict with existing zoning for, or cause rezoning of forest land, timberland, or timberland zoned Timberland Production—program Alternative 2: 450 MW	NI		
AG-3b: Conflict with existing zoning for, or cause rezoning of forest land, timberland, or timberland zoned Timberland Production—Golden Hills Project	NI		
AG-3c: Conflict with existing zoning for, or cause rezoning of forest land, timberland, or timberland zoned Timberland Production—Patterson Pass Project	NI		
AG-4a-1: Result in the loss of forest land or conversion of forest land to non-forest use—Program Alternative 1: 417 MW	NI		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
AG-4a-2: Result in the loss of forest land or conversion of forest land to non-forest use—Program Alternative 2: 450 MW	NI		
AG-4b: Result in the loss of forest land or conversion of forest land to non-forest use—Golden Hills Project	NI		
AG-4c: Result in the loss of forest land or conversion of forest land to non-forest use—Patterson Pass Project	NI		
AG-5a-1: Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use—program Alternative 1: 417 MW	S	AG-1: Avoid conversion of Prime Farmland	LTS
AG-5a-2: Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use—Program Alternative 2: 450 MW	S	AG-1: Avoid conversion of Prime Farmland	LTS
AG-5b: Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use—Golden Hills Project	NI		
AG-5c: Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use—Patterson Pass Project	NI		
Air Quality			
AQ-1a-1: Conflict with or obstruct implementation of the applicable air quality plan—program Alternative 1: 417 MW	LTS		
AQ-1a-2: Conflict with or obstruct implementation of the applicable air quality plan—Program Alternative 2: 450 MW	LTS		
AQ-1b: Conflict with or obstruct implementation of the applicable air quality plan—Golden Hills Project	LTS		
AQ-1c: Conflict with or obstruct implementation of the applicable air quality plan—Patterson Pass Project	LTS		
AQ-2a-1: Violate any air quality standard or contribute substantially to an existing or projected air quality violation—program Alternative 1: 417 MW	S	AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures	SU

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures	
AQ-2a-2: Violate any air quality standard or contribute substantially to an existing or projected air quality violation—program Alternative 2: 450 MW	S	AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures	SU
		AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures	
AQ-2b: Violate any air quality standard or contribute substantially to an existing or projected air quality violation—Golden Hills Project	S	AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures	SU
		AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures	
AQ-2c: Violate any air quality standard or contribute substantially to an existing or projected air quality violation—Patterson Pass Project	S	AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures	SU
		AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures	
AQ-3a-1: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)—Program Alternative 1: 417 MW	S	AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures	SU
		AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures	
AQ-3a-2: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)—Program Alternative 2: 450 MW	S	AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures	SU

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures	
AQ-3b: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)—Golden Hills Project	S	AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures	SU
		AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures	
AQ-3c: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)—Patterson Pass Project	S	AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures	SU
		AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures	
AQ-4a-1: Expose sensitive receptors to substantial pollutant concentrations—program Alternative 1: 417 MW	S	AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures	LTS
		AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures	
AQ-4a-2: Expose sensitive receptors to substantial pollutant concentrations—Program Alternative 2: 450 MW	S	AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures	LTS
		AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures	
AQ-4b: Expose sensitive receptors to substantial pollutant concentrations—Golden Hills Project	S	AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures	
AQ-4c: Expose sensitive receptors to substantial pollutant concentrations—Patterson Pass Project	S	AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures	LTS
		AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures	
AQ-5a-1: Create objectionable odors affecting a substantial number of people—program Alternative 1: 417 MW	LTS		
AQ-5a-2: Create objectionable odors affecting a substantial number of people—Program Alternative 2: 450 MW	LTS		
AQ-5b: Create objectionable odors affecting a substantial number of people—Golden Hills Project	LTS		
AQ-5c: Create objectionable odors affecting a substantial number of people—Patterson Pass Project	LTS		
Biological Resources			
BIO-1a-1: Potential for ground-disturbing activities to result in adverse effects on special-status plants or habitat occupied by special-status plants—program Alternative 1: 417 MW	S	BIO-1a: Conduct surveys to determine the presence or absence of special-status plant species	LTS
		BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	
		BIO-1c: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones	
		BIO-1d: Compensate for impacts on special-status plant species	
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
BIO-1a-2: Potential for ground-disturbing activities to result in adverse effects on special-status plants or habitat occupied by special-status plants—program Alternative 2: 450 MW	S	BIO-1a: Conduct surveys to determine the presence or absence of special-status plant species	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	
		BIO-1c: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones	
		BIO-1d: Compensate for impacts on special-status plant species	
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
BIO-1b: Potential for ground-disturbing activities to result in adverse effects on special-status plants or habitat occupied by special-status plants—Golden Hills Project	S	BIO-1a: Conduct surveys to determine the presence or absence of special-status plant species	LTS
		BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	
		BIO-1c: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones	
		BIO-1d: Compensate for impacts on special-status plant species	
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
BIO-1c: Potential for ground-disturbing activities to result in adverse effects on special-status plants or habitat occupied by special-status plants—Patterson Pass Project	S	BIO-1a: Conduct surveys to determine the presence or absence of special-status plant species	LTS
		BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	
		BIO-1c: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones	
		BIO-1d: Compensate for impacts on special-status plant species	
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
BIO-2a-1: Adverse effects on special-status plants and natural communities resulting from the introduction and spread of invasive plant species—program Alternative 1: 417 MW	S	BIO-2: Prevent introduction, spread, and establishment of invasive plant species	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
BIO-2a-2: Adverse effects on special-status plants and natural communities resulting from the introduction and spread of invasive plant species—program Alternative 2: 450 MW	S	BIO-2: Prevent introduction, spread, and establishment of invasive plant species	LTS
BIO-2b: Adverse effects on special-status plants and natural communities resulting from the introduction and spread of invasive plant species—Golden Hills Project	S	BIO-2: Prevent introduction, spread, and establishment of invasive plant species	LTS
BIO-2c: Adverse effects on special-status plants and natural communities resulting from the introduction and spread of invasive plant species—Patterson Pass Project	S	BIO-2: Prevent introduction, spread, and establishment of invasive plant species	LTS
BIO-3a-1: Potential mortality of or loss of habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle—program Alternative 1: 417 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-3b: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle	
BIO-3a-2: Potential mortality of or loss of habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle—program Alternative 2: 450 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-3b: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle	
BIO-3b: Potential mortality of or loss of habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle—Golden Hills Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-3b: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle	
BIO-3c: Potential mortality of or loss of habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle—Patterson Pass Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-3b: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle	
BIO-4a-1: Potential disturbance or mortality of and loss of suitable habitat for valley elderberry longhorn beetle—program Alternative 1: 417 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle	
		BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle	
BIO-4a-2: Potential disturbance or mortality of and loss of suitable habitat for valley elderberry longhorn beetle—program Alternative 2: 450 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle	
BIO-4b: Potential disturbance or mortality of and loss of suitable habitat for valley elderberry longhorn beetle—Golden Hills Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle	
		BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle	
BIO-4c: Potential disturbance or mortality of and loss of suitable habitat for valley elderberry longhorn beetle—Patterson Pass Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle	
		BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle	
BIO-5a-1: Potential disturbance or mortality of and loss of suitable habitat for California tiger salamander, western spadefoot, California red-legged frog, and foothill yellow-legged frog—program Alternative 1: 417 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-5b: Compensate for loss of habitat for special-status amphibians	
		BIO-5c: Restore disturbed annual grasslands	
BIO-5a-2: Potential disturbance or mortality of and loss of suitable habitat for California tiger salamander, western spadefoot, California red-legged frog, and foothill yellow-legged frog—program Alternative 2: 450 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians	
		BIO-5b: Compensate for loss of habitat for special-status amphibians	
		BIO-5c: Restore disturbed annual grasslands	
BIO-5b: Potential disturbance or mortality of and loss of suitable habitat for California tiger salamander, western spadefoot, California red-legged frog, and foothill yellow-legged frog—Golden Hills Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians	
		BIO-5b: Compensate for loss of habitat for special-status amphibians	
		BIO-5c: Restore disturbed annual grasslands	
BIO-5c: Potential disturbance or mortality of and loss of suitable habitat for California tiger salamander, western spadefoot, California red-legged frog, and foothill yellow-legged frog—Patterson Pass Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians	
		BIO-5b: Compensate for loss of habitat for special-status amphibians	
		BIO-5c: Restore disturbed annual grasslands	
BIO-6a-1: Potential disturbance or mortality of and loss of suitable habitat for western pond turtle—program Alternative 1: 417 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-6: Conduct preconstruction surveys for western pond turtle and monitor construction activities if turtles are observed	
BIO-6a-2: Potential disturbance or mortality of and loss of suitable habitat for western pond turtle—program Alternative 2: 450 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-6: Conduct preconstruction surveys for western pond turtle and monitor construction activities if turtles are observed	
BIO-6b: Potential disturbance or mortality of and loss of suitable habitat for western pond turtle—Golden Hills Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-6: Conduct preconstruction surveys for western pond turtle and monitor construction activities if turtles are observed	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
BIO-6c: Potential disturbance or mortality of and loss of suitable habitat for western pond turtle—Patterson Pass Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-6: Conduct preconstruction surveys for western pond turtle and monitor construction activities if turtles are observed	
BIO-7a-1: Potential disturbance or mortality of and loss of suitable habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip—program Alternative 1: 417 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5c: Restore disturbed annual grasslands	
		BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles	
		BIO-7b: Compensate for loss of habitat for special-status reptiles	
BIO-7a-2: Potential disturbance or mortality of and loss of suitable habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip—program Alternative 2: 450 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5c: Restore disturbed annual grasslands	
		BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles	
		BIO-7b: Compensate for loss of habitat for special-status reptiles	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
BIO-7b: Potential disturbance or mortality of and loss of suitable habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip—Golden Hills Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5c: Restore disturbed annual grasslands	
		BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles	
		BIO-7b: Compensate for loss of habitat for special-status reptiles	
BIO-7c: Potential disturbance or mortality of and loss of suitable habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip—Patterson Pass Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5c: Restore disturbed annual grasslands	
		BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles	
		BIO-7b: Compensate for loss of habitat for special-status reptiles	
BIO-8a-1: Potential construction-related disturbance or mortality of special-status and non–special-status migratory birds—program Alternative 1: 417 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5c: Restore disturbed annual grasslands	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non–special-status nesting birds	
		BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl	
BIO-8a-2: Potential construction-related disturbance or mortality of special-status and non–special-status migratory birds—program Alternative 2: 450 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5c: Restore disturbed annual grasslands	
		BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non–special-status nesting birds	
		BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl	
BIO-8b: Potential construction-related disturbance or mortality of special-status and non–special-status migratory birds—Golden Hills Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5c: Restore disturbed annual grasslands	
		BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non-special-status nesting birds	
		BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl	
BIO-8c: Potential construction-related disturbance or mortality of special-status and non-special-status migratory birds—Patterson Pass Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5c: Restore disturbed annual grasslands	
		BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non-special-status nesting birds	
		BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl	
BIO-9a-1: Permanent and temporary loss of occupied habitat for western burrowing owl and foraging habitat for tricolored blackbird and other special-status and non–special-status birds—program Alternative 1: 417 MW	S	BIO-5b: Compensate for loss of habitat for special-status amphibians	LTS
		BIO-5c: Restore disturbed annual grasslands	
		BIO-9: Compensate for the permanent loss of occupied habitat for western burrowing owl	
BIO-9a-2: Permanent and temporary loss of occupied habitat for western burrowing owl and foraging habitat for tricolored blackbird and other special-status and non–special-status birds—program Alternative 2: 450 MW	S	BIO-5b: Compensate for loss of habitat for special-status amphibians	LTS
		BIO-5c: Restore disturbed annual grasslands	
		BIO-9: Compensate for the permanent loss of occupied habitat for western burrowing owl	
BIO-9b: Permanent and temporary loss of occupied habitat for western burrowing owl and foraging habitat for tricolored blackbird and other special-status and non–special-status birds—Golden Hills Project	S	BIO-5b: Compensate for loss of habitat for special-status amphibians	LTS
		BIO-5c: Restore disturbed annual grasslands	
		BIO-9: Compensate for the permanent loss of occupied habitat for western burrowing owl	
BIO-9c: Permanent and temporary loss of occupied habitat for western burrowing owl and foraging habitat for tricolored blackbird and other special-status and non-special-status birds—Patterson Pass Project	S	BIO-5b: Compensate for loss of habitat for special-status amphibians	LTS
		BIO-5c: Restore disturbed annual grasslands	
		BIO-9: Compensate for the permanent loss of occupied habitat for western burrowing owl	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
BIO-10a-1: Potential injury or mortality of and loss of habitat for San Joaquin kit fox and American badger—program Alternative 1: 417 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species BIO-5c: Restore disturbed annual grasslands BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger	LTS
BIO-10a-2: Potential injury or mortality of and loss of habitat for San Joaquin kit fox and American badger—program Alternative 2: 450 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species BIO-5c: Restore disturbed annual grasslands BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger	LTS
BIO-10b: Potential injury or mortality of and loss of habitat for San Joaquin kit fox and American badger—Golden Hills Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species BIO-5c: Restore disturbed annual grasslands BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger	
BIO-10c: Potential injury or mortality of and loss of habitat for San Joaquin kit fox and American badger—Patterson Pass Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5c: Restore disturbed annual grasslands	
		BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger	
		BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger	
BIO-11a-1: Avian mortality resulting from interaction with wind energy facilities—program Alternative 1: 417 MW	S	BIO-11a: Prepare a project-specific avian protection plan	SU
		BIO-11b: Site turbines to minimize potential mortality of birds	
		BIO-11c: Use turbine designs that reduce avian impacts	
		BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure	
		BIO-11e: Retrofit existing infrastructure to minimize risk to raptors	
		BIO-11f: Discourage prey for raptors	
		BIO-11g: Implement postconstruction avian fatality monitoring for all repowering projects	
		BIO-11h: Compensate for the loss of raptors and other avian species, including golden eagles, by contributing to conservation efforts	
		BIO-11i: Implement an avian adaptive management program	
BIO-11a-2: Avian mortality resulting from interaction with wind energy facilities—program Alternative 2: 450 MW	S	BIO-11a: Prepare a project-specific avian protection plan	SU
		BIO-11b: Site turbines to minimize potential mortality of birds	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-11c: Use turbine designs that reduce avian impacts	
		BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure	
		BIO-11e: Retrofit existing infrastructure to minimize risk to raptors	
		BIO-11f: Discourage prey for raptors	
		BIO-11g: Implement postconstruction avian fatality monitoring for all repowering projects and implement adaptive management measures as necessary	
		BIO-11h: Compensate for the loss of raptors and other avian species, including golden eagles, by contributing to conservation efforts	
		BIO-11i: Implement an avian adaptive management program	
BIO-11b: Avian mortality resulting from interaction with wind energy facilities—Golden Hills Project	S	BIO-11a: Prepare a project-specific avian protection plan	SU
		BIO-11b: Site turbines to minimize potential mortality of birds	
		BIO-11c: Use turbine designs that reduce avian impacts	
		BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure	
		BIO-11e: Retrofit existing infrastructure to minimize risk to raptors	
		BIO-11f: Discourage prey for raptors	
		BIO-11g: Implement postconstruction avian fatality monitoring for all repowering projects and implement adaptive management measures as necessary	
		BIO-11h: Compensate for the loss of raptors and other avian species, including golden eagles, by contributing to conservation efforts	
		BIO-11i: Implement an avian adaptive management program	
BIO-11c: Avian mortality resulting from interaction with wind energy facilities—Patterson Pass Project	S	BIO-11a: Prepare a project-specific avian protection plan	SU

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-11b: Site turbines to minimize potential mortality of birds	
		BIO-11c: Use turbine designs that reduce avian impacts	
		BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure	
		BIO-11e: Retrofit existing infrastructure to minimize risk to raptors	
		BIO-11f: Discourage prey for raptors	
		BIO-11g: Implement postconstruction avian fatality monitoring for all repowering projects and implement adaptive management measures as necessary	
		BIO-11h: Compensate for the loss of raptors and other avian species, including golden eagles, by contributing to conservation efforts	
		BIO-11i: Implement an avian adaptive management program	
BIO-12a-1: Potential mortality or disturbance of bats from roost removal or disturbance—program Alternative 1: 417 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-12a: Conduct bat roost surveys	
		BIO-12b: Avoid removing or disturbing bat roosts	
BIO-12a-2: Potential mortality or disturbance of bats from roost removal or disturbance—program Alternative 2: 450 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-12a: Conduct bat roost surveys	
		BIO-12b: Avoid removing or disturbing bat roosts	
BIO-12b: Potential mortality or disturbance of bats from roost removal or disturbance—Golden Hills Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-12a: Conduct bat roost surveys	
		BIO-12b: Avoid removing or disturbing bat roosts	
BIO-12c: Potential mortality or disturbance of bats from roost removal or disturbance—Patterson Pass Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-12a: Conduct bat roost surveys	
		BIO-12b: Avoid removing or disturbing bat roosts	
BIO-13a-1: Potential for construction activities to temporarily remove or alter bat foraging habitat—program Alternative 1: 417 MW	LTS		
BIO-13a-2: Potential for construction activities to temporarily remove or alter bat foraging habitat—program Alternative 2: 450 MW	LTS		
BIO-13b: Potential for construction activities to temporarily remove or alter bat foraging habitat—Golden Hills Project	LTS		
BIO-13c: Potential for construction activities to temporarily remove or alter bat foraging habitat—Patterson Pass Project	LTS		
BIO-14a-1: Turbine-related fatalities of special-status and other bats—program Alternative 1: 417 MW	S	BIO-14a: Site and select turbines to minimize potential mortality of bats	SU
		BIO-14b: Implement postconstruction bat fatality monitoring program for all repowering projects	
		BIO-14c: Prepare and publish annual monitoring reports on the findings of bat use of the project area and fatality monitoring results	
		BIO-14d: Develop and implement a bat adaptive management plan	
		BIO-14e: Compensate for expenses incurred by rehabilitating injured bats	
BIO-14a-2: Turbine-related fatalities of special-status and other bats—program Alternative 2: 450 MW	S	BIO-14a: Site and select turbines to minimize potential mortality of bats	SU
		BIO-14b: Implement postconstruction bat fatality monitoring program for all repowering projects	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-14c: Prepare and publish annual monitoring reports on the findings of bat use of the project area and fatality monitoring results	
		BIO-14d: Develop and implement a bat adaptive management plan	
		BIO-14e: Compensate for expenses incurred by rehabilitating injured bats	
BIO-14b: Turbine-related fatalities of special-status and other bats—Golden Hills Project	S	BIO-14a: Site and select turbines to minimize potential mortality of bats	SU
		BIO-14b: Implement postconstruction bat fatality monitoring program for all repowering projects	
		BIO-14c: Prepare and publish annual monitoring reports on the findings of bat use of the project area and fatality monitoring results	
		BIO-14d: Develop and implement a bat adaptive management plan	
		BIO-14e: Compensate for expenses incurred by rehabilitating injured bats	
BIO-14c: Turbine-related fatalities of special-status and other bats—Patterson Pass Project	S	BIO-14a: Site and select turbines to minimize potential mortality of bats	SU
		BIO-14b: Implement postconstruction bat fatality monitoring program for all repowering projects	
		BIO-14c: Prepare and publish annual monitoring reports on the findings of bat use of the project area and fatality monitoring results	
		BIO-14d: Develop and implement a bat adaptive management plan	
		BIO-14e: Compensate for expenses incurred by rehabilitating injured bats	
BIO-15a-1: Potential for road infrastructure upgrades to result in adverse effects on alkali meadow—program Alternative 1: 417 MW	S	BIO-15: Compensate for the loss of alkali meadow habitat	LTS
BIO-15a-2: Potential for road infrastructure upgrades to result in adverse effects on alkali meadow—program Alternative 2: 450 MW	S	BIO-15: Compensate for the loss of alkali meadow habitat	LTS
BIO-15b: Potential for road infrastructure upgrades to result in adverse effects on alkali meadow—Golden Hills Project	S	BIO-15: Compensate for the loss of alkali meadow habitat	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
BIO-15c: Potential for road infrastructure upgrades to result in adverse effects on alkali meadow—Patterson Pass	NI		
BIO-16a-1: Potential for road infrastructure upgrades to result in adverse effects on riparian habitat—program Alternative 1: 417 MW	S	BIO-16: Compensate for the loss of riparian habitat	LTS
BIO-16a-2: Potential for road infrastructure upgrades to result in adverse effects on riparian habitat—program Alternative 2: 450 MW	S	BIO-16: Compensate for the loss of riparian habitat	LTS
BIO-16b: Potential for road infrastructure upgrades to result in adverse effects on riparian habitat—Golden Hills Project	S	BIO-16: Compensate for the loss of riparian habitat	LTS
BIO-16c: Potential for road infrastructure upgrades to result in adverse effects on riparian habitat—Patterson Pass Project	S	BIO-16: Compensate for the loss of riparian habitat	LTS
BIO-17a-1: Potential for ground-disturbing activities to result in direct adverse effects on common habitats—program Alternative 1: 417 MW	LTS		
BIO-17a-2: Potential for ground-disturbing activities to result in direct adverse effects on common habitats—program Alternative 2: 450 MW	LTS		
BIO-17b: Potential for ground-disturbing activities to result in direct adverse effects on common habitats—Golden Hills Project	LTS		
BIO-17c: Potential for ground-disturbing activities to result in direct adverse effects on common habitats—Patterson Pass Project	LTS		
BIO-18a-1: Potential for road infrastructure upgrades to result in adverse effects on wetlands—program Alternative 1: 417 MW	S	BIO-18: Compensate for the loss of wetlands	LTS
BIO-18a-2: Potential for road infrastructure upgrades to result in adverse effects on wetlands—program Alternative 2: 450 MW	S	BIO-18: Compensate for the loss of wetlands	LTS
BIO-18b: Potential for road infrastructure upgrades to result in adverse effects on wetlands—Golden Hills Project	S	BIO-18: Compensate for the loss of wetlands	LTS
BIO-18c: Potential for road infrastructure upgrades to result in adverse effects on wetlands—Patterson Pass Project	S	BIO-18: Compensate for the loss of wetlands	LTS
BIO-19a-1: Potential impact on the movement of any native resident or migratory wildlife species or established native resident or migratory wildlife corridors, and the use of native wildlife nursery sites—program Alternative 1: 417 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	SU
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle	
		BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians	
		BIO-5c: Restore disturbed annual grasslands	
		BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles	
		BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non–special-status nesting birds	
		BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl	
		BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger	
		BIO-11b: Site turbines to minimize potential mortality of birds	
		BIO-11c: Use turbine designs that reduce avian impacts	
		BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure	
		BIO-11e: Retrofit existing infrastructure to minimize risk to raptors	
		BIO-11i: Implement an avian adaptive management program	
		BIO-12a: Conduct bat roost surveys	
		BIO-12b: Avoid removing or disturbing bat roosts	
		BIO-14a: Site and select turbines to minimize potential mortality of bats	
		BIO-14d: Develop and implement a bat adaptive management plan	
BIO-19a-2: Potential impact on the movement of any native resident or migratory wildlife species or established native resident or migratory wildlife corridors, and the use of native wildlife nursery sites—program Alternative 2: 450 MW	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	SU

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians BIO-5c: Restore disturbed annual grasslands BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non–special-status nesting birds BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger BIO-11b: Site turbines to minimize potential mortality of birds BIO-11c: Use turbine designs that reduce avian impacts BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure BIO-11e: Retrofit existing infrastructure to minimize risk to raptors BIO-11i: Implement an avian adaptive management program BIO-12a: Conduct bat roost surveys BIO-12b: Avoid removing or disturbing bat roosts BIO-14a: Site and select turbines to minimize potential mortality of bats BIO-14d: Develop and implement a bat adaptive management plan	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
BIO-19b: Potential impact on 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—Golden Hills Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	SU
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle	
		BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians	
		BIO-5c: Restore disturbed annual grasslands	
		BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles	
		BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non–special-status nesting birds	
		BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl	
		BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger	
		BIO-11b: Site turbines to minimize potential mortality of birds	
		BIO-11c: Use turbine designs that reduce avian impacts	
		BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure	
		BIO-11e: Retrofit existing infrastructure to minimize risk to raptors	
		BIO-11i: Implement an avian adaptive management program	
		BIO-12a: Conduct bat roost surveys	
		BIO-12b: Avoid removing or disturbing bat roosts	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-14a: Site and select turbines to minimize potential mortality of bats	
		BIO-14d: Develop and implement a bat adaptive management plan	
BIO-19c: Potential impact on 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—Patterson Pass Project	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	SU
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle	
		BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians	
		BIO-5c: Restore disturbed annual grasslands	
		BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles	
		BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non–special-status nesting birds	
		BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl	
		BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger	
		BIO-11b: Site turbines to minimize potential mortality of birds	
		BIO-11c: Use turbine designs that reduce avian impacts	
		BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure	
		BIO-11e: Retrofit existing infrastructure to minimize risk to raptors	
		BIO-11i: Implement an avian adaptive management program	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-12a: Conduct bat roost surveys BIO-12b: Avoid removing or disturbing bat roosts BIO-14a: Site and select turbines to minimize potential mortality of bats BIO-14d: Develop and implement a bat adaptive management plan	
BIO-20a-1. Conflict with local plans or policies—program Alternative 1: 417 MW	S	BIO-1a: Conduct surveys to determine the presence or absence of special-status species BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species BIO-1c: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones BIO-1d: Compensate for impacts on special-status plant species BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas BIO-3a: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians BIO-5b: Compensate for loss of habitat for special-status amphibians BIO-5c: Restore disturbed annual grasslands BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles BIO-7b: Compensate for loss of habitat for special-status reptiles BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non-special-status nesting birds	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl	
		BIO-9: Compensate for the permanent loss of foraging habitat for western burrowing owl	
		BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger	
		BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger	
		BIO-15: Compensate for the loss of alkali meadow habitat	
		BIO-16: Compensate for the loss of riparian habitat	
		BIO-18: Compensate for the loss of wetlands	
BIO-20a-2. Conflict with local plans or policies—program Alternative 2: 450 MW	S	BIO-1a: Conduct surveys to determine the presence or absence of special-status species	LTS
		BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	
		BIO-1c: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones	
		BIO-1d: Compensate for impacts on special-status plant species	
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle	
		BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle	
		BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle	
		BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians	
		BIO-5b: Compensate for loss of habitat for special-status amphibians	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-5c: Restore disturbed annual grasslands	
		BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles	
		BIO-7b: Compensate for loss of habitat for special-status reptiles	
		BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non-special-status nesting birds	
		BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl	
		BIO-9: Compensate for the permanent loss of foraging habitat for western burrowing owl	
		BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger	
		BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger	
		BIO-15: Compensate for the loss of alkali meadow habitat	
		BIO-16: Compensate for the loss of riparian habitat	
		BIO-18: Compensate for the loss of wetlands	
BIO-20b. Conflict with local plans or policies—Golden Hills Project	S	BIO-1a: Conduct surveys to determine the presence or absence of special-status species	LTS
		BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	
		BIO-1c: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones	
		BIO-1d: Compensate for impacts on special-status plant species	
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle	
		BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle	
		BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians	
		BIO-5b: Compensate for loss of habitat for special-status amphibians	
		BIO-5c: Restore disturbed annual grasslands	
		BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles	
		BIO-7b: Compensate for loss of habitat for special-status reptiles	
		BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non-special-status nesting birds	
		BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl	
		BIO-9: Compensate for the permanent loss of foraging habitat for western burrowing owl	
		BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger	
		BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger	
		BIO-15: Compensate for the loss of alkali meadow habitat	
		BIO-16: Compensate for the loss of riparian habitat	
		BIO-18: Compensate for the loss of wetlands	
BIO-20c. Conflict with local plans or policies—Patterson Pass Project	S	BIO-1a: Conduct surveys to determine the presence or absence of special-status species	LTS
		BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	
		BIO-1c: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones	
		BIO-1d: Compensate for impacts on special-status plant species	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas BIO-3a: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians BIO-5b: Compensate for loss of habitat for special-status amphibians BIO-5c: Restore disturbed annual grasslands BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles BIO-7b: Compensate for loss of habitat for special-status reptiles BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non-special-status nesting birds BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl BIO-9: Compensate for the permanent loss of foraging habitat for western burrowing owl BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger BIO-16: Compensate for the loss of riparian habitat BIO-18: Compensate for the loss of wetlands	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
BIO-21a-1: Conflict with provisions of an adopted HCP/NCCP or other approved local, regional, or state habitat conservation plan—program Alternative 1: 417 MW	NI		
BIO-21a-2: Conflict with provisions of an adopted HCP/NCCP or other approved local, regional, or state habitat conservation plan—program Alternative 2: 450 MW	NI		
BIO-21b: Conflict with provisions of an adopted HCP/NCCP or other approved local, regional, or state habitat conservation plan—Golden Hills Project	NI		
BIO-21c: Conflict with provisions of an adopted HCP/NCCP or other approved local, regional, or state habitat conservation plan—Patterson Pass Project	NI		
Cultural Resources			
CUL-1a-1: Cause a substantial adverse change in the significance of a historical resource—program Alternative 1: 417 MW	S	CUL-1a: Avoid historic resources	LTS
		CUL-1b: Appropriate recordation of historic resources	
CUL-1a-2: Cause a substantial adverse change in the significance of a historical resource—program Alternative 2: 450 MW	S	CUL-1a: Avoid historic resources	LTS
		CUL-1b: Appropriate recordation of historic resources	
CUL-1b: Cause a substantial adverse change in the significance of a historic resource—Golden Hills Project	S	CUL-1a: Avoid historic resources	LTS
		CUL-1b: Appropriate recordation of historic resources	
CUL-1c: Cause a substantial adverse change in the significance of a historic resource—Patterson Pass Project	NI		
CUL-2a-1: Cause a substantial adverse change in the significance of an archaeological resource—program Alternative 1: 417 MW	S	CUL-2a: Conduct a preconstruction cultural field survey and cultural resources inventory and evaluation	LTS
		CUL-2b: Develop a treatment plan for any identified significant cultural resources	
		CUL-2c: Conduct worker awareness training for archaeological resources prior to construction	
		CUL-2d: Stop work if cultural resources are encountered during ground-disturbing activities	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
CUL-2a-2: Cause a substantial adverse change in the significance of an archaeological resource—program Alternative 2: 450 MW	S	CUL-2a: Conduct a preconstruction cultural field survey and cultural resources inventory and evaluation CUL-2b: Develop a treatment plan for any identified significant cultural resources CUL-2c: Conduct worker awareness training for archaeological resources prior to construction CUL-2d: Stop work if cultural resources are encountered during ground-disturbing activities	LTS
CUL-2b: Cause a substantial adverse change in the significance of an archaeological resource—Golden Hills Project	S	CUL-2a: Conduct a preconstruction cultural field survey and cultural resources inventory and evaluation CUL-2b: Develop a treatment plan for any identified significant cultural resources CUL-2c: Conduct worker awareness training for archaeological resources prior to construction CUL-2d: Stop work if cultural resources are encountered during ground-disturbing activities CUL-2e: Avoid all cultural resources during construction and operation	LTS
CUL-2c: Cause a substantial adverse change in the significance of an archaeological resource—Patterson Pass Project	S	CUL-2a: Conduct a preconstruction cultural field survey and cultural resources inventory and evaluation CUL-2b: Develop a treatment plan for any identified significant cultural resources CUL-2c: Conduct worker awareness training for archaeological resources prior to construction CUL-2d: Stop work if cultural resources are encountered during ground-disturbing activities	LTS
CUL-3a-1: Disturb any human remains, including those interred outside of formal cemeteries—program Alternative 1: 417 MW	S	CUL-3: Stop work if human remains are encountered during ground-disturbing activities	LTS
CUL-3a-2: Disturb any human remains, including those interred outside of formal cemeteries—program Alternative 2: 450 MW	S	CUL-3: Stop work if human remains are encountered during ground-disturbing activities	LTS
CUL-3b: Disturb any human remains, including those interred outside of formal cemeteries—Golden Hills Project	S	CUL-3: Stop work if human remains are encountered during ground-disturbing activities	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
CUL-3c: Disturb any human remains, including those interred outside of formal cemeteries—Patterson Pass Project	S	CUL-3: Stop work if human remains are encountered during ground-disturbing activities	LTS
Geology, Soils, Mineral Resources, and Paleontological Resources			
GEO-1a-1: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of rupture of a known earthquake fault—program Alternative 1: 417 MW	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-1a-2: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of rupture of a known earthquake fault—program Alternative 2: 450 MW	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-1b: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of rupture of a known earthquake fault—Golden Hills Project	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-1c: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of rupture of a known earthquake fault—Patterson Pass Project	LTS		
GEO-2a-1: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of strong seismic ground shaking—program Alternative 1: 417 MW	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-2a-2: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of strong seismic ground shaking—program Alternative 2: 450 MW	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-2b: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of strong seismic ground shaking— Golden Hills Project	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-2c: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of strong seismic ground shaking— Patterson Pass Project	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-3a-1: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of seismic-related ground failure, including landsliding and liquefaction—program Alternative 1: 417 MW	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
GEO-3a-2: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of seismic-related ground failure, including landsliding and liquefaction—program Alternative 2: 450 MW	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-3b: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of seismic-related ground failure, including landsliding and liquefaction—Golden Hills Project	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-3c: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of seismic-related ground failure, including landsliding and liquefaction—Patterson Pass Project	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-4a-1: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of landsliding—program Alternative 1: 417 MW	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-4a-2: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of landsliding—program Alternative 2: 450 MW	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-4b: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of landsliding—Golden Hills Project	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-4c: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death as a result of landsliding—Patterson Pass Project	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-5a-1: Result in substantial soil erosion or the loss of topsoil—program Alternative 1: 417 MW	LTS		
GEO-5a-2: Result in substantial soil erosion or the loss of topsoil—program Alternative 2: 450 MW	LTS		
GEO-5b: Result in substantial soil erosion or the loss of topsoil—Golden Hills Project	LTS		
GEO-5c: Result in substantial soil erosion or the loss of topsoil—Patterson Pass Project	LTS		
GEO-6a-1: Be located on expansive soil, creating substantial risks to life or property—program Alternative 1: 417 MW	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
GEO-6a-2: Be located on expansive soil, creating substantial risks to life or property—program Alternative 2: 450 MW	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-6b: Be located on expansive soil, creating substantial risks to life or property—Golden Hills Project	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-6c: Be located on expansive soil, creating substantial risks to life or property—Patterson Pass Project	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-7a-1: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature—program Alternative 1: 417 MW	S	GEO-7a: Retain a qualified professional paleontologist to monitor significant ground-disturbing activities GEO-7b: Educate construction personnel in recognizing fossil material GEO-7c: Stop work if substantial fossil remains are encountered during construction	LTS
GEO-7a-2: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature—program Alternative 2: 450 MW	S	GEO-7a: Retain a qualified professional paleontologist to monitor significant ground-disturbing activities GEO-7b: Educate construction personnel in recognizing fossil material GEO-7c: Stop work if substantial fossil remains are encountered during construction	LTS
GEO-7b: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature—Golden Hills Project	S	GEO-7a: Retain a qualified professional paleontologist to monitor significant ground-disturbing activities GEO-7b: Educate construction personnel in recognizing fossil material GEO-7c: Stop work if substantial fossil remains are encountered during construction	LTS
GEO-7c: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature—Patterson Pass Project	S	GEO-7a: Retain a qualified professional paleontologist to monitor significant ground-disturbing activities GEO-7b: Educate construction personnel in recognizing fossil material	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		GEO-7c: Stop work if substantial fossil remains are encountered during construction	
Greenhouse Gas Emissions			
GHG-1a-1: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment—program Alternative 1: 417 MW	LTS		
GHG-1a-2: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment—program Alternative 2: 450 MW	LTS		
GHG-1b: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment—Golden Hills Project	LTS		
GHG-1c: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment—Patterson Pass Project	LTS		
GHG-2a-1: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases—program Alternative 1: 417 MW	S	GHG-2a: Implement best available control technology for heavy-duty vehicles	LTS
		GHG-2b: Install low SF_6 leak rate circuit breakers and monitoring	
		GHG-2c: Require new construction to use building materials containing recycled content	
		GHG-2d: Comply with construction and demolition debris management ordinance	
GHG-2a-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases—program Alternative 2: 450 MW	S	GHG-2a: Implement best available control technology for heavy-duty vehicles	LTS
		GHG-2b: Install low SF_6 leak rate circuit breakers and monitoring	
		GHG-2c: Require new construction to use building materials containing recycled content	
		GHG-2d: Comply with construction and demolition debris management ordinance	
GHG-2b: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases—Golden Hills Project	S	GHG-2a: Implement best available control technology for heavy-duty vehicles	LTS
		GHG-2b: Install low SF_6 leak rate circuit breakers and monitoring	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		GHG-2c: Require new construction to use building materials containing recycled content	
		GHG-2d: Comply with construction and demolition debris management ordinance	
GHG-2c: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases—Patterson Pass Project	S	GHG-2a: Implement best available control technology for heavy-duty vehicles	LTS
		GHG-2b: Install low SF_6 leak rate circuit breakers and monitoring	
		GHG-2c: Require new construction to use building materials containing recycled content	
		GHG-2d: Comply with construction and demolition debris management ordinance	
Hazards and Hazardous Materials			
HAZ-1a-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials—program Alternative 1: 417 MW	LTS		
HAZ-1a-2: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials—program Alternative 2: 450 MW	LTS		
HAZ-1b: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials—Golden Hills Project	LTS		
HAZ-1c: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials—Patterson Pass Project	LTS		
HAZ-2a-1: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment—program Alternative 1: 417 MW	LTS		
HAZ-2a-2: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment—program Alternative 2: 450 MW	LTS		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
HAZ-2b: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment—Golden Hills Project	LTS		
HAZ-2c: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment—Patterson Pass Project	LTS		
HAZ-3a-1: Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school—program Alternative 1: 417 MW	NI		
HAZ-3a-2: Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school—program Alternative 2: 450 MW	NI		
HAZ-3b: Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school—Golden Hills Project	NI		
HAZ-3c: Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school—Patterson Pass Project	NI		
HAZ-4a-1: Location on a hazardous materials site, creating a significant hazard to the public or the environment—program Alternative 1: 417 MW	S	HAZ-4: Perform a Phase I Environmental Site Assessment prior to construction activities and remediate if necessary	LTS
HAZ-4a-2: Location on a hazardous materials site, creating a significant hazard to the public or the environment—program Alternative 2: 450 MW	S	HAZ-4: Perform a Phase I Environmental Site Assessment prior to construction activities and remediate if necessary	LTS
HAZ-4b: Location on a hazardous materials site, creating a significant hazard to the public or the environment—Golden Hills Project	S	HAZ-4: Perform a Phase I Environmental Site Assessment prior to construction activities and remediate if necessary	LTS
HAZ-4c: Location on a hazardous materials site, creating a significant hazard to the public or the environment—Patterson Pass Project	S	HAZ-4: Perform a Phase I Environmental Site Assessment prior to construction activities and remediate if necessary	LTS
HAZ-5a-1: Location within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard for people residing or working in the project area—program Alternative 1: 417 MW	S	HAZ-5: Coordinate with the Contra Costa ALUC prior to final design	LTS
HAZ-5a-2: Location within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard for people residing or working in the project area—program Alternative 2: 450 MW	S	HAZ-5: Coordinate with the Contra Costa ALUC prior to final design	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
HAZ-5b: Location within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard for people residing or working in the project area—Golden Hills Project	LTS		
HAZ-5c: Location within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard for people residing or working in the project area—Patterson Pass Project	LTS		
HAZ-6a-1: Location within the vicinity of a private airstrip, resulting in a safety hazard for people residing or working in the project area—program Alternative 1: 417 MW	LTS		
HAZ-6a-2: Location within the vicinity of a private airstrip, resulting in a safety hazard for people residing or working in the project area—program Alternative 2: 450 MW	LTS		
HAZ-6b: Location within the vicinity of a private airstrip, resulting in a safety hazard for people residing or working in the project area—Golden Hills Project	LTS		
HAZ-6c: Location within the vicinity of a private airstrip, resulting in a safety hazard for people residing or working in the project area—Patterson Pass Project	LTS		
HAZ-7a-1: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan—program Alternative 1: 417 WM	S	TRA-1: Develop and implement a construction traffic control plan	LTS
HAZ-7a-2: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan—program Alternative 2: 450 WM	S	TRA-1: Develop and implement a construction traffic control plan	LTS
HAZ-7b: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan—Golden Hills Project	S	TRA-1: Develop and implement a construction traffic control plan	LTS
HAZ-7c: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan—Patterson Pass Project	LTS	TRA-1: Develop and implement a construction traffic control plan	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
HAZ-8a-1: Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands—program Alternative 1: 417 WM	LTS		
HAZ-8a-2: Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands—program Alternative 2: 450 WM	LTS		
HAZ-8b: Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands—Golden Hills Project	LTS		
HAZ-8c: Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands—Patterson Pass Project	LTS		
HAZ-9a-1: During normal operation, the effects of bending and stress on rotor blades over time could lead to blade failure and become a potential blade throw hazard—program Alternative 1: 417 MW	LTS		
HAZ-9a-2: During normal operation, the effects of bending and stress on rotor blades over time could lead to blade failure and become a potential blade throw hazard—program Alternative 2: 450 MW	LTS		
HAZ-9b: During normal operation, the effects of bending and stress on rotor blades over time could lead to blade failure and become a potential blade throw hazard—Golden Hills Project	LTS		
HAZ-9c: During normal operation, the effects of bending and stress on rotor blades over time could lead to blade failure and become a potential blade throw hazard—Patterson pass Project	LTS		
Hydrology and Water Quality			
WQ-1a-1: Violate any water quality standards or waste discharge requirements—program Alternative 1: 417 MW	S	WQ-1: Comply with NPDES requirements	LTS
WQ-1a-2: Violate any water quality standards or waste discharge requirements—program Alternative 2: 450 MW	S	WQ-1: Comply with NPDES requirements	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
WQ-1b: Violate any water quality standards or waste discharge requirements—Golden Hills Project	S	WQ-1: Comply with NPDES requirements	LTS
WQ-1c: Violate any water quality standards or waste discharge requirements—Patterson Pass Project	S	WQ-1: Comply with NPDES requirements	LTS
WQ-2a-1: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)—program Alternative 1: 417 MW	LTS		
WQ-2a-2: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)—program Alternative 2: 450 MW	LTS		
WQ-2b: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)—Golden Hills Project	LTS		
WQ-2c: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)—Patterson Pass Project	LTS		
WQ-3a-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite—program Alternative 1: 417 MW	S	WQ-1: Comply with NPDES requirements	LTS
WQ-3a-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite—program Alternative 2: 450 MW	S	WQ-1: Comply with NPDES requirements	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
WQ-3b: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite—Golden Hills Project	S	WQ-1: Comply with NPDES requirements	LTS
WQ-3c: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite—Patterson Pass Project	S	WQ-1: Comply with NPDES requirements	LTS
WQ-4a-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite—program Alternative 1: 417 MW	S	WQ-1: Comply with NPDES requirements	LTS
WQ-4a-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite—program Alternative 2: 450 MW	S	WQ-1: Comply with NPDES requirements	LTS
WQ-4b: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite—Golden Hills Project	S	WQ-1: Comply with NPDES requirements	LTS
WQ-4c: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite—Patterson Pass Project	S	WQ-1: Comply with NPDES requirements	LTS
WQ-5a-1: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff—program Alternative 1: 417 MW	S	WQ-1: Comply with NPDES requirements	LTS
WQ-5a-2: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff—program Alternative 2: 450 MW	S	WQ-1: Comply with NPDES requirements	LTS
WQ-5b: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff—Golden Hills Project	S	WQ-1: Comply with NPDES requirements	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
WQ-5c: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff—Patterson Pass Project	S	WQ-1: Comply with NPDES requirements	LTS
WQ-6a-1: Otherwise substantially degrade water quality—program Alternative 1: 417 MW	S	WQ-1: Comply with NPDES requirements	LTS
WQ-6a-2: Otherwise substantially degrade water quality—program Alternative 2: 450 MW	S	WQ-1: Comply with NPDES requirements	LTS
WQ-6b: Otherwise substantially degrade water quality—Golden Hills Project	S	WQ-1: Comply with NPDES requirements	LTS
WQ-6c: Otherwise substantially degrade water quality—Patterson Pass Project	S	WQ-1: Comply with NPDES requirements	LTS
WQ-7a-1: Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map—program Alternative 1: 417 MW	NI		
WQ-7a-2: Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map—program Alternative 2: 450 MW	NI		
WQ-7b: Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map—Golden Hills Project	NI		
WQ-7c: Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map—Patterson Pass Project	NI		
WQ-8a-1: Place within a 100-year flood hazard area structures that would impede or redirect floodflows—program Alternative 1: 417 MW	NI		
WQ-8a-2: Place within a 100-year flood hazard area structures that would impede or redirect floodflows—program Alternative 2: 450 MW	NI		
WQ-8b: Place within a 100-year flood hazard area structures that would impede or redirect floodflows—Golden Hills Project	NI		
WQ-8c: Place within a 100-year flood hazard area structures that would impede or redirect floodflows—Patterson Pass Project	NI		
WQ-9a-1: Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam—program Alternative 1: 417 MW	NI		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
WQ-9a-2: Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam—program Alternative 2: 450 MW	LTS		
WQ-9b: Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam—Golden Hills Project	LTS		
WQ-9c: Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam—Patterson Pass Project	LTS		
WQ-10a-1: Contribute to inundation by seiche, tsunami, or mudflow—program Alternative 1: 417 MW	S	WQ-1: Comply with NPDES requirements	LTS
WQ-10a-2: Contribute to inundation by seiche, tsunami, or mudflow—program Alternative 2: 450 MW	S	WQ-1: Comply with NPDES requirements	LTS
WQ-10b: Contribute to inundation by seiche, tsunami, or mudflow—Golden Hills Project	S	WQ-1: Comply with NPDES requirements	LTS
WQ-10c: Contribute to inundation by seiche, tsunami, or mudflow—Patterson Pass Project	S	WQ-1: Comply with NPDES requirements	LTS
Land Use and Planning			
LU-1a-1: Physically divide an established community—program Alternative 1: 417 MW	NI		
LU-1a-2: Physically divide an established community—program Alternative 2: 450 MW	NI		
LU-1b: Physically divide an established community—Golden Hills Project	NI		
LU-1c: Physically divide an established community—Patterson Pass Project	NI		
LU-2a-1: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect—program Alternative 1: 417 MW	NI		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
LU-2a-2: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect—program Alternative 2: 450 MW	NI		
LU-2b: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect—Golden Hills Project	NI		
LU-2c: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect—Patterson Pass Project	NI		
LU-3a-1: Conflict with any applicable habitat conservation plan or natural community conservation plan—program Alternative 1: 417 MW	NI		
LU-3a-2: Conflict with any applicable habitat conservation plan or natural community conservation plan—program Alternative 2: 450 MW	NI		
LU-3b: Conflict with any applicable habitat conservation plan or natural community conservation plan—Golden Hills Project	NI		
LU-3c: Conflict with any applicable habitat conservation plan or natural community conservation plan—Patterson Pass Project	NI		
Noise			
NOI-1a-1: Exposure of residences to noise from new wind turbines—program Alternative 1: 417 MW	S	NOI-1: Perform project-specific noise studies and implement measures to comply with County noise standards	LTS
NOI-1a-2: Exposure of residences to noise from new wind turbines—program Alternative 2: 450 MW	S	NOI-1: Perform project-specific noise studies and implement measures to comply with County noise standards	LTS
NOI-1b: Exposure of residences to noise from new wind turbines—Golden Hills Project	S	NOI-1: Perform project-specific noise studies and implement measures to comply with County noise standards	LTS
NOI-1c: Exposure of residences to noise from new wind turbines—Patterson Pass Project	LTS		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
NOI-2a-1: Exposure of residences to noise during decommissioning and new turbine construction—program Alternative 1: 417 MW	S	NOI-2: Employ noise-reducing practices during decommissioning and new turbine construction	LTS
NOI-2a-2: Exposure of residences to noise during decommissioning and new turbine construction—program Alternative 2: 450 MW	S	NOI-2: Employ noise-reducing practices during decommissioning and new turbine construction	LTS
NOI-2b: Exposure of residences to noise during decommissioning and new turbine construction—Golden Hills Project	S	NOI-2: Employ noise-reducing practices during decommissioning and new turbine construction	LTS
NOI-2c: Exposure of residences to noise during decommissioning and new turbine construction—Patterson Pass Project	LTS		
Population and Housing			
POP-1a-1: Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)—program Alternative 1: 417 MW	NI		
POP-1a-2: Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)—program Alternative 2: 450 MW	NI		
POP-1b: Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly)e.g., through extension of roads or other infrastructure)—Golden Hills Project	NI		
POP-1c: Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)—Patterson Pass Project	NI		
POP-2a-1: Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere—program Alternative 1: 417 MW	NI		
POP-2a-2: Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere—program Alternative 2: 450 MW	NI		
POP-2b: Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere—Golden Hills Project	NI		
POP-2c: Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere—Patterson Pass Project	NI		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
POP-3a-1: Displace a substantial number of people, necessitating the construction of replacement housing elsewhere—program Alternative 1: 417 MW	NI		
POP-3a-2: Displace a substantial number of people, necessitating the construction of replacement housing elsewhere—program Alternative 2: 450 MW	NI		
POP-3b: Displace a substantial number of people, necessitating the construction of replacement housing elsewhere—Golden Hills Project	NI		
POP-3c: Displace a substantial number of people, necessitating the construction of replacement housing elsewhere—Patterson Pass Project	NI		
Public Services			
PS-1a-1: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: fire protection; police protection; schools; parks; other public facilities—program Alternative 1: 417 MW	NI		
PS-1a-2: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: fire protection; police protection; schools; parks; other public facilities—program Alternative 2: 450 MW	NI		
PS-1b: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: fire protection; police protection; schools; parks; other public facilities—Golden Hills Project	NI		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
PS-1c: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: fire protection; police protection; schools; parks; other public facilities—Patterson Pass Project	NI		
Recreation			
REC-1a-1: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated—program Alternative 1: 417 MW	NI		
REC-1a-2: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated—program Alternative 2: 450 MW	NI		
REC-1b: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated—Golden Hills Project	NI		
REC-1c: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated—Patterson Pass Project	NI		
REC-2a-1: Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment—program Alternative 1: 417 MW	NI		
REC-2a-2: Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment—program Alternative 2: 450 MW	NI		
REC-2b: Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment—Golden Hills Project	NI		
REC-2c: Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment—Patterson Pass Project	NI		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Transportation/Traffic			
TRA-1a-1: Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit or conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways—program Alternative 1: 417 MW	S	TRA-1: Develop and implement a construction traffic control plan	LTS
TRA-1a-2: Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit or conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways—program Alternative 2: 450 MW	S	TRA-1: Develop and implement a construction traffic control plan	LTS
TRA-1b: Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit or conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways—Golden Hills Project	S	TRA-1: Develop and implement a construction traffic control plan	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
TRA-1c: Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit or conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways—Patterson Pass Project	S	TRA-1: Develop and implement a construction traffic control plan	LTS
TRA-2a-1: Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways—program Alternative 1: 417 MW	LTS		
TRA-2a-2: Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways— program Alternative 2: 450 MW	LTS		
TRA-2b: Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways—Golden Hills Project	LTS		
TRA-2c: Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways—Patterson Pass Project	LTS		
TRA-3a-1: Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks—program Alternative 1: 417 MW	LTS		
TRA-3a-2: Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks—program Alternative 2: 450 MW	LTS		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
TRA-3b: Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks—Golden Hills Project	LTS		
TRA-3c: Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks—Patterson Pass Project	LTS		
TRA-4a-1: Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) due to construction-generated traffic—program Alternative 1: 417 MW	S	TRA-1: Develop and implement a construction traffic control plan	LTS
TRA-4a-2: Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) due to construction-generated traffic—program Alternative 2: 450 MW	S	TRA-1: Develop and implement a construction traffic control plan	LTS
TRA-4b: Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) due to construction-generated traffic—Golden Hills Project	S	TRA-1: Develop and implement a construction traffic control plan	LTS
TRA-4c: Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) due to construction-generated traffic—Patterson Pass Project	S	TRA-1: Develop and implement a construction traffic control plan	LTS
TRA-5a-1: Result in inadequate emergency access due to construction-generated traffic—program Alternative 1: 417 MW	S	TRA-1: Develop and implement a construction traffic control plan	LTS
TRA-5a-2: Result in inadequate emergency access due to construction-generated traffic—program Alternative 2: 450 MW	S	TRA-1: Develop and implement a construction traffic control plan	LTS
TRA-5b: Result in inadequate emergency access due to construction-generated traffic—Golden Hills Project	S	TRA-1: Develop and implement a construction traffic control plan	LTS
TRA-5c: Result in inadequate emergency access due to construction-generated traffic—Patterson Pass Project	S	TRA-1: Develop and implement a construction traffic control plan	LTS
TRA-6a-1: Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities—program Alternative 1: 417 MW	S	TRA-1: Develop and implement a construction traffic control plan	LTS
TRA-6a-2: Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities—program Alternative 2: 450 MW	S	TRA-1: Develop and implement a construction traffic control plan	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
TRA-6b: Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities—Golden Hills Project	S	TRA-1: Develop and implement a construction traffic control plan	LTS
TRA-6c: Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities—Patterson Pass Project	S	TRA-1: Develop and implement a construction traffic control plan	LTS
Utilities and Service Systems			
UT-1a-1: Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board—program Alternative 1: 417 MW	LTS		
UT-1a-2: Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board—program Alternative 2: 450 MW	LTS		
UT-1b: Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board—Golden Hills Project	LTS		
UT-1c: Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board—Patterson Pass Project	LTS		
UT-2a-1: Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—program Alternative 1: 417 MW	NI		
UT-2a-2: Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—program Alternative 2: 450 MW	NI		
UT-2b: Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—Golden Hills Project	NI		
UT-2c: Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—Patterson Pass Project	NI		
UT-3a-1: Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—program Alternative 1: 417 MW	LTS		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
UT-3a-2: Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—program Alternative 2: 450 MW	LTS		
UT-3b: Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—Golden Hills Project	LTS		
UT-3c: Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—Patterson Pass Project	LTS		
UT-4a-1: Require new or expanded entitlements to water resources—program Alternative 1: 417 MW	LTS		
UT-4a-2: Require new or expanded entitlements to water resources—program Alternative 2: 450 MW	LTS		
UT-4b: Require new or expanded entitlements to water resources—Golden Hills Project	LTS		
UT-4c: Require new or expanded entitlements to water resources—Patterson Pass Project	LTS		
UT-5a-1: Result in a determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the program's projected demand in addition to the provider's existing commitments—program Alternative 1: 417 MW	NI		
UT-5a-2: Result in a determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the program's projected demand in addition to the provider's existing commitments—program Alternative 2: 450 MW	NI		
UT-5b: Result in a determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments—Golden Hills Project	NI		
UT-5c: Result in a determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments—Patterson Pass Project	NI		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
UT-6a-1: Generate solid waste that would exceed the permitted capacity of landfills to accommodate the program's solid waste disposal needs—program Alternative 1: 417 MW	LTS		
UT-6a-2: Generate solid waste that would exceed the permitted capacity of landfills to accommodate the program's solid waste disposal needs—program Alternative 2: 450 MW	LTS		
UT-6b: Generate solid waste that would exceed the permitted capacity of landfills to accommodate the program's solid waste disposal needs—Golden Hills Project	LTS		
UT-6c: Generate solid waste that would exceed the permitted capacity of landfills to accommodate the program's solid waste disposal needs—Patterson Pass Project	LTS		
UT-7a-1: Not comply with federal, state, and local statutes and regulations related to solid waste—program Alternative 1: 417 MW	NI		
UT-7a-2: Not comply with federal, state, and local statutes and regulations related to solid waste—program Alternative 2: 450 MW	NI		
UT-7b: Not comply with federal, state, and local statutes and regulations related to solid waste—Golden Hills Project	NI		
UT-7c: Not comply with federal, state, and local statutes and regulations related to solid waste—Patterson Pass Project	NI		

SU = significant and unavoidable; S = significant; LTS = less than significant; NI = no impact.

Chapter 1
Introduction

1.1 Purpose of the PEIR

This Program Environmental Impact Report (PEIR) has been prepared in accordance with the provisions of the California Environmental Quality Act (CEQA) to evaluate the potential impacts of repowering the Alameda County portion of the Altamont Pass Wind Resources Area (APWRA), including two individual wind energy repowering projects: the Golden Hills Wind Energy Facility Repowering Project (Golden Hills Project), and the Patterson Pass Wind Farm Repowering Project (Patterson Pass Project). The PEIR is intended to identify the anticipated environmental impacts of conditional use permits (CUPs) that may be approved by Alameda County (County) for repowering windfarm projects in the Alameda County portion of the APWRA—hereafter referred to as the *program area*—through 2018 and beyond: both those currently proposed—the two individual projects—and those expected to be proposed (collectively, the *program* addressed in this PEIR).

1.1.1 California Environmental Quality Act Requirements

The County has prepared this PEIR in compliance with CEQA (Public Resources Code [PRC] Section 21000 et seq.) and the State CEQA Guidelines (California Code of Regulations [CCR], Title 14, Chapter 3, Section 15000 et seq.). As required by CEQA, the PEIR is an informational document to aid in public review and official decision making. The PEIR addresses both the program and the individual projects, disclosing information describing the environmental setting; potential direct, indirect, cumulative, and growth-inducing impacts of the proposed program; mitigation measures that could be implemented to reduce or avoid those impacts; alternatives to the proposed program; and impacts that would remain significant and unavoidable even after mitigation. The County is the CEQA Lead Agency for this program.

1.1.2 Program-Level Analysis and Tiering

The State CEQA Guidelines encourage agencies to use a PEIR in circumstances that involve a series of related projects. A PEIR provides a framework for conducting future environmental analyses for the individual projects, a process known as *tiering*. In this case, environmental analyses of individual repowering projects would be tiered off this PEIR. The concept of tiering is described in State CEQA Guidelines Section 15152.

a) "Tiering" refers to using the analysis of general matters contained in a broader EIR (such as one prepared for a general plan or policy statement) with later EIRs and negative declarations on narrower projects; incorporating by reference the general discussions from the broader EIR; and concentrating the later EIR or negative declaration solely on the issues specific to the later project.

b) Agencies are encouraged to tier the environmental analyses which they prepare for separate but related projects… This approach can eliminate repetitive discussions of the same issues and focus the later EIR or negative declaration on the actual issues ripe for decision at each level of environmental review.

This approach reduces repetitive analysis of issues that may be common to multiple projects. In this case, use of a PEIR allows the County to characterize the proposed program as the "project" being analyzed and approved and to consider broad policy alternatives and program-wide mitigation measures early in the planning effort for the program.

This is a program- and project-level EIR analyzing a series of actions that are related geographically and that are likely to have similar environmental effects that can be mitigated in similar ways (see CEQA Guidelines section 15168(a)). The program-level analysis addresses the environmental impacts of anticipated requests to repower existing wind energy projects in the APWRA. The project-level analyses apply to two repowering projects for which the County has already received applications.

This PEIR is the first tier of environmental documentation. It would be augmented by second-tier environmental documents as appropriate when additional details for the specific repowering projects are developed. These project-level environmental documents would incorporate by reference appropriate information from this PEIR regarding secondary effects, cumulative impacts, broad alternatives, and other relevant factors. These environmental documents would focus solely on site-specific issues that have not been considered in this PEIR. If activities were later found to have effects that were not examined in this PEIR, additional CEQA review would be required. If the County finds that implementation of a later activity would have no new effects and that no new mitigation measures would be required, that activity would require no additional CEQA review.

This PEIR is designed to reflect the distinction between program-level and project-level analyses. The individual projects are described in Chapter 2, *Program Description*.

1.1.3 Scope of this PEIR

The focus of this PEIR is to evaluate the environmental consequences of the program described above. The PEIR evaluates the following environmental topics in depth.

- Aesthetics
- Agriculture Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology, Soils, Mineral Resources, and Paleontological Resources
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Noise and Vibration
- Population and Housing
- Public Services
- Recreation

- Transportation and Traffic
- Utilities

1.2 Program Overview

1.2.1 General Physical Setting

The APWRA is an approximately 50,000-acre area that extends across the northeastern hills of Alameda County and a smaller portion of Contra Costa County to the north (Figure 1-1). The region is generally characterized by rolling foothills of annual grassland used as grazing land. The program area (Figure 1-2) is mostly treeless and undeveloped with relatively steep terrain in the west and gently rolling hills in the east toward the floor of the Central Valley and San Joaquin County. Major features of the area include the wind turbines, ancillary facilities, an extensive grid of high-voltage power transmission lines, substations, microwave towers, a landfill site, Interstate (I-) 580, railroad lines, ranch houses, and clusters of rural residential homes on Dyer and Midway Roads.

1.2.2 The Altamont Pass Wind Resource Area

The APWRA sustains a strong and predictable wind resource due mainly to the funneling of cool marine winds from the Pacific Ocean east through the pass to replace the rising hot summer air of the Central Valley. As a result, the area is ideal for generating electrical power from wind. The environmental benefits of wind energy production are primarily that the manner of energy production does not result in the emission of any pollutants into the air or water, and although production varies from day to day and season to season, it uses a renewable resource that is almost constant and undiminished. More recently, due to recognition of the effects of conventional energy production (from fossil fuels) on global climate change, the harnessing of wind for energy production has become increasingly important. The APWRA, its wind resource characteristics, and the locations of existing turbines are shown in Figure 1-3.

The Altamont Pass was identified as a wind resource area by the California Energy Commission (CEC) in 1980. The CEC established the APWRA in response to the passage of the Public Utilities Regulatory Policies Act of 1978. This legislation was specifically intended to accomplish the goals listed below (Alameda County 1998).

- Reduce U.S. dependence on foreign fuel.
- Ensure energy security through fuel diversity.
- Support new, clean, renewable sources of power generation.
- Support electric generation by non-utility entities.

The 1978 Public Utilities Regulatory Policies Act created a market for wind power and other renewable energy sectors by obligating public utilities to purchase electric power from independent producers so that public utilities could avoid costs associated with power generation. In addition, the simultaneous availability of federal and state tax credits provided economic incentives for the development of wind power generation facilities (Alameda County 1998). In response, wind companies researched local wind patterns and wind turbine design, negotiated with land owners and local governments for land easements and permits, and constructed, operated, and maintained wind farms in the APWRA to supply power to regional utility providers.

1.2.3 Land Use Regulations

Most of the program area is designated as Large Parcel Agriculture (LPA) under the County's *East County Area Plan* (ECAP), adopted in 1994 and amended in 2000 by the voter initiative Measure D. The ECAP established minimum parcel sizes (100 acres) and maximum building intensity (floor area ratio [FAR]) for specific areas of the east county. Subject to the provisions, policies, and programs of the ECAP, the LPA designation permits one single-family residence per parcel, agricultural uses; agricultural processing facilities; public and quasi-public uses; quarries; landfills and related facilities; and "windfarms and related facilities, utility corridors and similar uses compatible with agriculture." A short section of the ECAP also established policies recognizing the importance of wind power as a clean, renewable source of energy, enabling continued operation, redevelopment, and expansion of windfarm facilities within environmental constraints (Alameda County 2000). (*Note:* Measure D did not alter any policies regarding windfarms).

The Alameda County Zoning Ordinance (Title 17 of the County's General Ordinance Code) designates the program area as "A" (Agriculture), which allows "privately owned wind-electric generators" (i.e., wind farms) as a conditional use. Permitted uses in the A district include single-family residences, general agriculture, grazing, riding or hiking trails and, with a conditional use permit, outdoor recreation facilities, transmission facilities, solid waste landfills, and windfarms (Alameda County 2000). Accordingly, windfarm operators must seek a conditional use permit (CUP) from the County prior to constructing and/or operating wind turbine generators.

1.2.4 Conditional Use Permits

History through 2000

The County approved 54 CUPs between 1981 and 1993 for privately owned windfarms in the APWRA. By the mid-1990s the APWRA was the largest windfarm region in the world, with more than 7,200 operating turbines. Many of the windfarms overlapped, with separate permits issued to different operating companies on individual parcels. Various turbine designs by different manufacturers were used, with maximum production capacity of most individual turbines ranging from 40 to 150 kilowatts (kW). A small proportion of turbines were built with capacities of up to 400 kW. Moreover, several turbines have changed hands; projects have been purchased by other operators; and a number of turbines have been removed at the direction of the Scientific Review Committee (SRC) because they were identified as high-risk turbines. A list of current CUPs and their associated projects, operators, owners, and parcel numbers is provided in Appendix A.

In the mid-1980s it became evident that birds were colliding with wind turbine blades, and that many of the birds killed were protected raptor species, including golden eagle, red-tailed hawk, burrowing owl, and American kestrel. Many studies investigated the causal relationship between turbine facilities and avian mortality, and several recommendations emerged for siting future turbines, managing existing facilities, and removing individual turbines that, because of certain siting and physical characteristics, resulted in higher rates of avian mortality than predicted. In 1998, Alameda and Contra Costa Counties approved a repowering program that established protocols for replacing many older, smaller turbines with fewer larger, more productive turbines.

The program was intended to both maintain energy production and reduce avian mortality through a combination of siting guidelines and reductions in rotor-swept area.

A comprehensive PEIR (combined with some project-specific components, as in the present case, and hereinafter referred to as the 1998 Repowering PEIR) was prepared in 1998 by Alameda and Contra Costa Counties for a repowering program that was applicable only to the windfarm sites that were then in operation—most but not all of the APWRA. Based on the operational capacity of the APWRA windfarms as of 1998 to produce up to 583.3 megawatts (MW), the repowering program established that capacity level as an interim cap or limit on additional development of production capacity in the entire APWRA. In Alameda County the 1998 production capacity and repowering program ceiling was set at 416.4 MW. The repowering program generally stated that no additional production capacity would be permitted until monitoring indicated that avian mortality and other environmental impacts of such increases could be effectively mitigated or avoided. To simplify analysis and discussion, the program generation capacity is referred to in this EIR as 417 MW.

The other main component of the 1998 Repowering PEIR and repowering program was a Biological Resources Management Plan (BRMP) with three main types of guidelines, including avian impact avoidance through design, siting, and operations, and management of special-status species with additional special measures. However, for a variety of reasons, including federal tax policies, energy prices, and legal actions by environmental advocacy groups, only one repowering project was completed in the Alameda County portion of the APWRA (the 36 MW Diablo Winds project, initiated in 2003 and operated by Altamont Power for NextEra Energy, LLC [NextEra]).

History since 2001

Beginning in 2001, as the CUPs issued in the 1980s and 1990s began to expire, the windfarm companies submitted applications to renew the CUPs for continued operations of existing facilities. In November 2003, the East County Board of Zoning Adjustments (EBZA) approved 14 separate CUPs, with conditions, for the continued maintenance and operation of wind turbines in the program area, with no specified termination date. The following January (2004), EBZA approved another set of 15 CUPs; these had a 20-year term. These CUPs were issued to four operators: SeaWest Power Resources LLC (also referred to as AES Wind Generation Co.), Windworks (also operating as Altamont Power Company and its affiliate Altamont Winds Inc. [AWI]), Altamont Infrastructure Company, and enXco, Inc. (enXco, now EDF Renewable Energy [EDF RE]). EBZA determined on both occasions that its decision to issue the CUPs was categorically exempt from CEQA (as *existing facilities* under Section 15301 of the State CEQA Guidelines) on the basis that there would be negligible or no expansion of the existing facilities. The Center for Biological Diversity (CBD), Californians for Renewable Energy (CARE), and Golden Gate Audubon Society appealed these approvals to the County Board of Supervisors (BOS), primarily on the grounds that the categorical exemption from CEQA was in error, and that special circumstances warranted a requirement for environmental analysis under CEQA.

On September 22, 2005, the BOS partly upheld EBZA's decision to grant the CUPs and partly granted the appeal with final County approval of the CUPs, with the inclusion of several conditions of approval advocated by CBD, CARE, and Golden Gate Audubon Society. The County made the following key findings related to repowering turbines and imposed the conditions listed below to address impacts associated with avian mortality in the program area.

1. An environmental impact report (EIR) was required to be prepared to evaluate both existing windfarm operations and a repowering program, to be initiated progressively over the life of the CUPs.
2. The CUPs would expire in 13 years (2018).
3. An APWRA Scientific Review Committee was required to be formed.
4. An Avian Wildlife Protection Program & Schedule (Exhibit G of the 2005 CUP) was established with requirements for seasonal shutdown and removal of high risk turbines, and a schedule to remove turbines for repowering in increments of 10% by September 2009, 35% by 2013, 85% by 2015, and 100% by the end of the CUP term in 2018.
5. Reviews of progress to affirm the findings of the CUPs (e.g., required by the public need, no adverse effects on the health or safety of persons residing or working in the vicinity, etc.) were required in Years 3, 6, and 8.

More specifically, the CUPs required that:

> …the Permittee(s), in cooperation with the County, will sponsor the preparation of an Environmental Impact Report (EIR) for the purpose of evaluating the environmental impacts of the repowering program and the continued operation of existing turbine facilities (and progressive removal under the repowering program). Using state-of-the-art scientific investigations, reports prepared by the County consultant, and data from all other sources, the EIR will assess the environmental impacts of the repowering program (including both specific proposals and the overall repowering program set forth herein), the continued operation of existing turbine facilities, and the effectiveness of the various strategies to reduce and minimize avian mortality and other adverse impacts on wildlife (such as new wind turbine technology, site-specific measures, grazing management, etc.). The EIR will seek to verify and validate current assumptions regarding the benefit of repowering as a means of substantially and significantly reducing the amount of avian injury and mortality resulting from most existing types of turbines, and identify appropriate means of ensuring that repowered turbines have the lowest possible rate of avian mortality. The EIR shall also study siting in the Altamont as a whole, and may also address how to provide incentives for an increased rate of repowering, including expanding areas where wind power facilities may be permitted.

This PEIR is intended to comply with the above requirements of the 2005 CUPs.

Following the 2005 CUP approvals, CARE, Golden Gate Audubon Society, Ohlone Audubon Society, Mount Diablo Audubon Society, Santa Clara Valley Audubon Society, and Marin Audubon Society (collectively Audubon) petitioned the County Superior Court for a writ of mandate to set aside the County's issuance of the CUPs on various grounds, including the contention that the action violated the County's general plan and CEQA. This dispute is referred to as the *CEQA Litigation*.

After extensive negotiations, a framework for settling the CEQA Litigation was agreed to in November 2006. The outcome was the 2007 Settlement Agreement among Audubon; CARE; three wind power companies (AES Wind Generation, enXco, and NextEra); and the County (collectively, the *Settling Parties*). Altamont Winds Inc. (AWI) elected not to be a party to the agreement. On January 11, 2007, the County modified the CUPs of the Settling Party Wind Companies in keeping with the terms of the 2007 Settlement Agreement. In particular, the 2005 CUPs' Exhibit G *Avian Wildlife Protection Program & Schedule* was amended to include Exhibit G-1 for the Settling Party Wind Companies and Exhibit G-2 for the non-settling wind energy company, AWI.

The primary results of the 2007 Settlement Agreement for the Settling Parties included changes to Exhibit G, elimination of progress reviews in Years 3 and 6, and acceleration of habitat conservation strategies or components. Specifically, the 2007 Settlement Agreement had seven major provisions, summarized below.

1. Wind companies will reduce avian raptor mortality by 50% by November 2009. This condition is applicable to four raptor species: golden eagle, burrowing owl, American kestrel, and red-tailed hawk.
2. If the desired reduction is not achieved, an adaptive management program will be instituted and Alameda County will act on any needed permit modifications, provided the measures are consistent with the objectives of the Settlement Agreement.
3. Targeted higher risk turbines will be removed or relocated within 30 days of the Settlement Agreement.
4. Additional targeted turbines will be removed or relocated by October 31, 2008.
5. Seasonal shutdowns will be modified in the 2007–2008 season for data consistency.
6. Companies may paint blades of up to 450 turbines as an experiment to reduce avian mortality.
7. Parties will develop an NCCP applicable to activities of turbine owners and operators only.

Specific requirements attached to AWI as the only non-settling party. Key requirements from Exhibit G-2 of the 2005 CUPs that are not currently outdated require the following actions related to seasonal shutdown and eventual permanent decommissioning of non-repowered turbines.

- Between October 2010 and September 2018, from November 1 of each year to the following February 15, AWI will cease operations of its existing (non-repowered) turbines.
- By September 30, 2009, AWI will have ceased operation and permanently removed 10% of its individually owned existing turbines in preparation for installation of repowered turbines.
- By September 30, 2013, AWI will have ceased operation and permanently removed an additional 25% (a total of 60% of all turbines covered by the 2005 CUPs are required to be removed) of its individually owned existing turbines.
- By September 30, 2015, AWI will have ceased operation and permanently removed an additional 50% of its then-existing individually owned turbines (a total of 92.7% of all turbines covered by the 2005 CUPs are required to be removed).
- By September 30, 2018, AWI will have ceased operation and permanently removed the remainder of its turbines such that 100% of AWI's turbines covered by the 2005 CUPs are permanently removed.

In 2007, preparation of an NCCP/HCP was initiated. In addition to the Settling Party Wind Companies, AWI and its affiliate WindWorks Inc. joined the NCCP/HCP process. AWI was subject to a 3-year review, which began in 2008, but which was suspended or held in abeyance due to AWI's tentative agreement at that time to participate in the NCCP/HCP process and other actions that would have put AWI on an equal footing with the Settling Party Wind Companies (a 3-year review requirement under the original Exhibit G had been eliminated for Settling Party Wind Companies under Exhibit G-1). Although the NCCP/HCP process was also suspended subsequently by 2011 for reasons outside the wind companies' or County's control, an 8-year review also required by the 2005 CUPs of AWI's compliance with the permit conditions, including Exhibit G-1, was completed in 2013, together with approval of a request by AWI to modify the conditions of approval to allow continued operation of most of its turbines through 2015 only, instead of their progressive removal between 2013 and 2018.

The goal of the NCCP/HCP process was to facilitate repowering by addressing needs for environmental compliance while adhering to the requirements of the 2007 Settlement Agreement. However, the APWRA NCCP/HCP faced three primary and interrelated challenges.

- Delays and uncertain participation by the U.S. Fish and Wildlife Service (USFWS) due to reduced staffing at that agency.
- Regulatory challenges of the Bald and Golden Eagle Protection Act (BGEPA)
- A desire of two of the wind companies to repower a large portion of program area before the APWRA NCCP/HCP could be completed.

In light of these challenges, the County determined that the best approach to meet the objectives of the 2005 CUPs and the 2007 Settlement Agreement was a PEIR as the primary CEQA document, together with a program-level Avian Protection Plan (APP) to be developed as a mitigation measure and standard condition of approval. The program-level APP was intended to provide a framework for operation of turbines that will be incorporated into project-specific APPs developed by each project applicant prior to commencing repowering construction. Because no mechanism to implement the APP was developed, the provisions of the program-level APP were incorporated into the program-level mitigation measures presented in Section 3.4, *Biological Resources*, of this PEIR. In addition, the County decided to analyze in this PEIR those individual projects for which applications containing sufficient detail to support CEQA analysis had been submitted to enable the County to issue new CUPs. These applications were submitted by Golden Hills Wind, LLC (Golden Hills) for its Golden Hills Wind Energy Facility Repowering Project Phase I (Golden Hills Project and EDF RE for its Patterson Pass Wind Farm Repowering Project (Patterson Pass Project).

It is anticipated that new CUPs issued by the County will incorporate the mitigation measures in this PEIR as conditions of approval. Although CUPs issued in the past were linked to a mixture of individual property owners and windfarm operating companies, the current expectation is for a relatively limited number of separate use permits linked only to the individual operating companies and applicable to multiple properties and parcels.

1.2.5 Program Components

In compliance with the directive provided in the 2005 CUPs (excerpted above) and the 2007 Settlement Agreement, the program as defined in this PEIR has three separate but related components.

- The "continued operation of existing turbine facilities (and progressive removal under the repowering program)." As described in the 2007 Settlement Agreement and as permitted under the 2005 CUPs (described in Section 2.4).
- The anticipated approval of new CUPs to allow repowering of wind turbines in the Alameda County portion of the APWRA (described in Section 2.5).
- Two specific repowering proposals: the Golden Hills Wind Energy Facility Repowering Project (Golden Hills) and the Patterson Pass Project (EDF) (described in Section 2.6).

The primary purpose of the proposed program is to facilitate wind energy production through repowering and to avoid and minimize impacts on wildlife caused by repowered wind turbine construction, operation, and maintenance in the program area. First- and second-generation windfarms will continue to be operated under the 2005 CUPs (described below) until such time as each windfarm is fully decommissioned or repowered. Repowered wind farms would be constructed and operated under a new CUP that will be based in part on the findings of this PEIR. Chapter 2, *Program Description*, provides a more detailed description of these components. To facilitate a robust analysis, two alternatives have been identified for the program. Alternative 1 would entail a maximum generation capacity of 417 MW; Alternative 2 would increase that maximum to 450 MW.

As noted above, two individual wind projects—for which adequate information to support a project-level analysis is available—are considered in this PEIR. These projects are described in detail in Chapter 2. Moreover, the analyses presented in Chapter 3, *Impact Analysis*, distinguishes between program-level and project level impacts.

A third individual project—the Sand Hills Wind Project—is currently undergoing separate CEQA review. This is a pilot project utilizing an experimental technology—shrouded turbines, described in greater detail in Chapter 2, *Program Description*—and as such is not evaluated in this PEIR. If the new technology proves successful in reducing avian mortality, the intention is to complete the Sand Hill repowering project using shrouded turbines. If results do not support continued use of this technology, conventional turbines would instead be installed to repower the existing project, in which case the analysis in this PEIR would cover the remainder of the Sand Hills project at a program level; however, additional project-level analysis would be required.

1.2.6 Anticipated Environmental Benefits

The program is intended to support a variety of goals and objectives, which will in turn support environmental benefits for resident terrestrial and avian species, their habitats, and general ecological values. In addition, improvements in wind turbine technology and project design would result in benefits associated with aesthetics, public safety, and noise. Some of these benefits are discussed below.

Habitat Enhancements

The marked reduction in the number of turbines, coupled with the undergrounding of most of the electrical infrastructure, would result in substantial reductions of ground disturbance, installed facilities, and maintenance activities. These reductions would result in fewer vehicle trips and the associated risks of wildlife collisions; decreased roadway dust generation; smaller risk of spills of fuel, oils, and solvents; and decreased risk of the spread of noxious weeds. The smaller number of turbines widely separated also means that instead of firebreak corridors surrounding long strings of turbines, only the immediate area around each turbine (a 30-foot radius from the turbine foundation) needs to be cleared of vegetation.

Decommissioning of existing facilities would create an opportunity to restore the footprints of roads, foundations, and other removed facilities with native vegetation and other habitat characteristics to support ecological integrity. Such activities, together with the wider distribution of the repowered turbines, would reduce habitat fragmentation.

New roads would be designed with appropriate drainage features (e.g., culverts, bio-retention areas) to improve surface water quality during rainfall events and reduce sediment loading associated with stormwater runoff that would otherwise have an adverse effect on aquatic species.

Finally, as required by the 2007 Settlement Agreement and set forth in mitigation measures developed for this PEIR, project proponents would contribute to the establishment of conservation areas and easements within the program area in which wind turbine development would not occur or outside the program area but in the same eco-region. Such areas would provide enhanced habitat qualities for avian and terrestrial species on a coordinated, landscape-level basis.

Reductions in Avian Mortality

Repowered turbines have been shown to result in substantial reductions in avian mortality for a variety of reasons. Significantly, while the program area under existing conditions supported more than 4,000 turbines, complete repowering would result in fewer than 300. The removal of almost all overhead power and communication lines would lead to fewer avian and bat collisions and electrocutions. Lattice-type wind turbine towers and other tower designs that currently provide hazardous perching and nesting opportunities for avian species would be eliminated.

Multiyear monitoring results suggest that the high level of avian mortality associated with the existing turbines has been reduced since 2005 primarily through the implementation of winter seasonal shutdowns. The new turbines are expected to be operated year-round; however, in light of early evidence from similar new-generation turbine facilities and because of the vastly reduced number of individual turbines needed to yield the same capacity, their slower rotational speeds, and the habitat benefits described above, the year-round operations are expected to have much lower winter-season avian mortality rates than the existing facilities.

Improved Visual Qualities

Repowering would greatly alter the landscape, with major reductions in the number of individual turbines in the area. For example, the Golden Hills Project would reduce turbines removed to new turbines installed by a ratio of nearly 15:1; the reduction for the Patterson Pass project would be at least 28:1. The wider distribution of the fewer and more uniform modern turbines would detract less from the natural landscape and allow for more prominent views of the rolling, grassy terrain that characterizes the program area.

Public Safety Improvements

Repowering would result in public safety benefits for several reasons: reductions in fire hazard, the underground placement of electrical lines, improved turbine technology that reduces the risk of blade throw, and the very substantial reduction in the number of individual turbines.

Section 3.8 of the PEIR provides a discussion of fire risks, and indicates that the most common causes of wildland fire at windfarms are hardware and/or conductor failures of power collection lines, dropping of collection lines, turbine malfunction or mechanical failure, and avian electrocution incidents. Because of their age, design, and large number, the existing turbines present a greater risk of fire ignition than do the proposed new turbines. Repowering, by reducing the number of turbines and undergrounding the electrical collection system, would therefore reduce the likelihood of fire ignition associated with hardware failure, electrical line failure, and avian electrocutions.

Installation of new turbines would also greatly reduce the potential and probability of blade throw or failure associated with existing wind turbines. Most fourth-generation turbines, such as those proposed for the program, are equipped with newer safety and engineering features to reduce the risk of blade failure and are designed for safe operation under normal conditions. The rotors of these turbines are provided with blade pitch controls that regulate the angle of the rotor blade into the wind, as well as redundant brake mechanisms that can control speed and shutdown or slowdown in response to excessive wind speed. The greatly reduced number of individual wind turbines would also reduce the probability of blade throw, which in any case is far lower for new-generation than for old-generation turbines.

Reduced Noise

As discussed in Section 3. 11 of the PEIR, the fourth-generation turbines are typically *upwind* turbines, meaning each turbine faces into the wind, so the wind encounters the rotor blades before the tower and nacelle, making for quieter operations than downwind turbines. Additionally, the modern turbines have relatively low rotational speeds and pitch control on the rotors, both of which reduce sound levels compared to the sound produced by first- and second-generation turbines.

1.2.7 Use and Limitations

The program is the anticipated approval by the County of new CUPs for repowering wind projects over time in the APWRA. EBZA is responsible for reviewing and acting on the permit proposals. EBZA will adopt the necessary finding and may approve, conditionally approve, or deny each project based on the analysis in this PEIR or, if necessary, a project-level analysis. If approved, permits would include standard conditions consistent with mitigation measures contained in this PEIR or comparable measures developed in the project-specific environmental documents.

Under the program as proposed, the installed capacity of the program area would not increase above the level defined by the 1998 Repowering PEIR—416.4 MW in the Alameda County portion of the APWRA. As indicated in Section 1.2.4, the 1998 repowering program intended the capacity limit as an interim measure pending research and monitoring until it was firmly determined that the program was effective at reducing avian mortality, a process that was expected to take several years. At the time the 2005 CUPs were approved, the installed capacity of the program area was slightly less than 370 MW; as of October 2011, the capacity was 322 MW, primarily due to phased reductions in capacity required by the CUPs and removal of turbines specifically identified as presenting evident or potential hazards to avian species. The numeric ratio of new turbines to existing turbines would vary depending on the installed capacity of the turbines being removed, the installed capacity of the new turbines, and the capacity limit of each individual project. However, it is presumed that far fewer turbines would be installed than are being removed.

Each wind energy company that currently holds a CUP is expected to initiate a repowering project before the CUPs expire in 2018. Because existing wind companies hold leases and use permits to operate the existing assets, any new company must acquire existing assets (i.e., existing first- and second-generation turbines) that would subsequently be decommissioned prior to installing current-generation turbines. Any project whose impacts are not adequately evaluated in this PEIR would have to undergo additional, project-level environmental analysis; however, such analysis may be able to tier from this PEIR. Once the existing first- and second- generation turbines in the program area have been replaced with new turbines, no new permits will be granted until the program has been reevaluated. The actual number of turbines that may be installed will depend on future specific repowering proposals.

The Final PEIR allows the public and the lead agency to review revisions to the Draft PEIR, comments, responses to comments, and other components of the PEIR before approval of the proposed project. This Final PEIR is intended to inform the County of the proposed program and projects' potential to result in significant effects on the environment and of means of reducing those impacts, when feasible.

After completing the Final PEIR and before approving the proposed program and projects, the County must make the following three certifications (State CEQA Guidelines Section 15090).

- The Final PEIR has been completed in compliance with CEQA.
- The Final PEIR was presented to county officials and they have reviewed and considered the information in the Final PEIR before approving the proposed project.
- The Final PEIR reflects the County's independent judgment and analysis.

In addition, if a Final EIR that has been certified for a project identifies one or more significant environmental impacts, the County must adopt findings of fact (State CEQA Guidelines Section 15091[a]). For each significant impact, the County must make one or more of the following findings.

- Changes or alterations have been required in or incorporated into the proposed project that avoid or substantially lessen the significant environmental impacts as identified in the EIR.
- Such changes or alterations are within the responsibility and jurisdiction of another public agency, not the agency making the finding. Such changes have been adopted by another agency or can and should be adopted by another agency.
- Specific economic, legal, social, technological, or other considerations—including provision of employment opportunities for highly trained workers—make infeasible the mitigation measures or project alternatives identified in the Final EIR.

Each finding must be accompanied by a brief explanation of the rationale for the finding. In addition, the County must adopt a program for reporting or monitoring the changes that it has either required in the proposed project or made a condition of approval to avoid or substantially lessen impacts (State CEQA Guidelines Section 15091[d]). The mitigation measures themselves must be fully enforceable through permit conditions, agreements, or other measures. This program is referred to as the mitigation monitoring and reporting program (MMRP).

Whenever a lead agency such as the County approves a project that would result in significant and unavoidable impacts that are disclosed in the EIR, the agency must state in writing its reasons for supporting the approved action (State CEQA Guidelines Section 15093[b]). This *statement of overriding considerations* will be supported by substantial information in the record, including the Final PEIR. Because the proposed project would result in significant and unavoidable impacts, the County must adopt a statement of overriding considerations if it approves the proposed project. The statement of overriding considerations is not a substitute for the findings of fact described above.

The recommended certifications, draft findings of fact, and a draft statement of overriding considerations will be included in a separate findings document. The Final PEIR, findings of fact, and statement of overriding considerations will be used by the County to help inform its deliberations on the proposed project.

1.3 Public Participation

The County has provided, and will provide, opportunities for the public to participate in the environmental review processes. These opportunities are summarized below.

1.3.1 Scoping

The County distributed a Notice of Preparation (NOP) of a draft EIR for the proposed program August 24, 2010. The NOP was distributed for a 30-day comment period that ended October 8, 2010. Comments on the NOP were considered in the preparation of the EIR. Appendix B contains the NOP and written comments received on the NOP.

The County held a public scoping meeting to introduce the program to interested members of the public and to solicit public input. The public meeting was held on September 2, 2010. Public comments at this meeting were recorded for consideration during the planning and environmental review process.

Key issues of public concern that were raised during the scoping process are listed below.

- The location of repowered turbines.
- The required setback for turbines from residential properties.
- Noise generation from turbines and potential effects on nearby residents.
- Impacts on local and migratory birds.

1.3.2 Draft PEIR Public Review

Public participation is an important component of the environmental review process. CEQA does not require formal hearings at any stage of the environmental review process (State CEQA Guidelines Section 15202[a]). However, CEQA encourages "wide public involvement, formal and informal…in order to receive and evaluate public reactions to environmental issues" (State CEQA Guidelines Section 15201). The County distributed an NOP for the PEIR on August 24, 2010, to identify issues of concern regarding the project and to incorporate comments into the analysis for the PEIR. Comments on the NOP were considered in the preparation of the PEIR.

CEQA requires the lead agency (the County) to prepare an EIR that reflects the independent judgment of the agency regarding the impacts of the project, the level of significance of the impacts both before and after mitigation, and mitigation measures proposed to reduce the impacts. A draft EIR is circulated to responsible agencies, trustee agencies with resources affected by the project, and interested agencies and individuals. The purposes of public and agency review of a draft EIR include sharing expertise, disclosing agency analyses, checking accuracy, detecting omissions, discovering public concerns, and soliciting counterproposals.

Reviewers of a draft EIR should focus on the sufficiency of the document in identifying and analyzing the possible impacts on the environment and ways in which the significant effects of the project might be avoided or mitigated. Comments are most helpful when they suggest additional specific alternatives or mitigation measures that would provide better ways to avoid or mitigate significant environmental effects.

The Draft PEIR was released for a 45-day public review period from June 6, 2014, to 5 p.m. July 21, 2104, and circulated to state agencies for review through the State Clearinghouse of the Governor's Office of Planning and Research. Comments on the Draft PEIR were due to the County no later than 5 p.m. on July 21, 2014, and could be forwarded by any of the following methods.

Mail: Sandra Rivera
Assistant Planning Director
224 W. Winton, Room 111
Hayward, CA 94544

Email: Sandra.Rivera@acgov.org

Fax: 510-785-8793

A public meeting was held at 1:30 p.m. on June 26, 2014, in the City of Pleasanton Council Chambers, at a meeting of the East County Board of Zoning Adjustments, 200 Old Bernal Avenue, Pleasanton. Comments on the Draft PEIR were received during the regularly scheduled meeting.

1.4 Lead and Responsible Agencies and Permit Approvals

This PEIR may be used by several responsible or trustee agencies that also have review authority over the proposed plan. As stated in State CEQA Guidelines Section 15231:

> A final EIR prepared by a lead agency or a negative declaration adopted by a lead agency shall be conclusively presumed to comply with CEQA for purposes of use by responsible agencies which were consulted pursuant to Sections 15072 or 15082 unless one of the following conditions occurs:
>
> (a) The EIR or Negative Declaration is finally adjudged in a legal proceeding not to comply with the requirements of CEQA, or
>
> (b) A subsequent EIR is made necessary by Section 15162 of these Guidelines.

The various local, state, and federal agencies that may use the EIR are identified below.

Key project approvals are required before repowering construction may begin. These approvals include, but may not be limited to, the certification of the Final PEIR (and any tiered EIR that may be required if complete project-level analysis is not achieved by the Final PEIR), approval of a new CUP for each individual repowering project, and issuance of a grading permit and an encroachment permit for each individual repowering project. Implementation of the program and specific projects may require other discretionary actions and approvals from the following agencies.

- Alameda County
- Alameda County Public Works Agency
- San Francisco Bay Regional Water Quality Control Board
- Central Valley Regional Water Quality Control Board
- California Public Utilities Commission
- California Department of Transportation
- California Department of Fish and Wildlife

- U.S. Army Corps of Engineers
- Federal Aviation Administration
- U.S. Fish and Wildlife Service

As Lead Agency under CEQA, the County provided each public agency that commented on the Draft PEIR with a copy of its responses to comments at least 10 days before certifying the Final PEIR.

1.5 Organization of the Document

This PEIR and supporting information are presented in the chapters and appendices listed below. An electronic copy of the Draft PEIR showing revisions is provided on CD.

Chapter 1, *Introduction*, provides an introduction and overview describing the focus of the PEIR and the environmental review process.

Chapter 2, *Program Description*, describes the program and the two individual projects analyzed at the project-specific level, providing details on location, objectives, and required approvals.

Chapter 3, *Impact Analysis*, describes the environmental setting and provides analysis of the environmental impacts of the program and projects, identifying mitigation measures for any significant impacts.

Chapter 4, *Other CEQA Considerations*, provides a discussion of significant and unavoidable impacts, significant irreversible environmental effects, growth-inducing impacts, and cumulative impacts.

Chapter 5, *Alternatives*, provides an evaluation of the five program alternatives.

Chapter 6, *Preparers*, identifies the individuals involved in the preparation of this document.

Appendix A, *Existing Wind Projects in the APWRA*, identifies the individual CUPs of existing wind projects and provides characteristics of existing facilities in the program area.

Appendix B, *NOP and Scoping Materials*, provides the Notice of Preparation and scoping comments that were received in response to the NOP.

Appendix C, *Biological Resources Supporting Information*, provides EDF RE's biological survey report, presents mitigation ratios as set forth in the East Alameda County Conservation Strategy, depicts the mitigation locations identified in the strategy, and provides a sample Resource Equivalency Analysis (REA) for determining appropriate levels of compensatory mitigation for turbine-related impacts on raptors, including golden eagles.

Appendix D, *Noise Data*, provides the assumptions on which the noise analysis is based.

Appendix E, *Comments on the Draft Environmental Impact Report and Responses to Comments*, provides reproductions of annotated comment letters, responses to those comments, and text revisions where such revisions were made in response to comments.

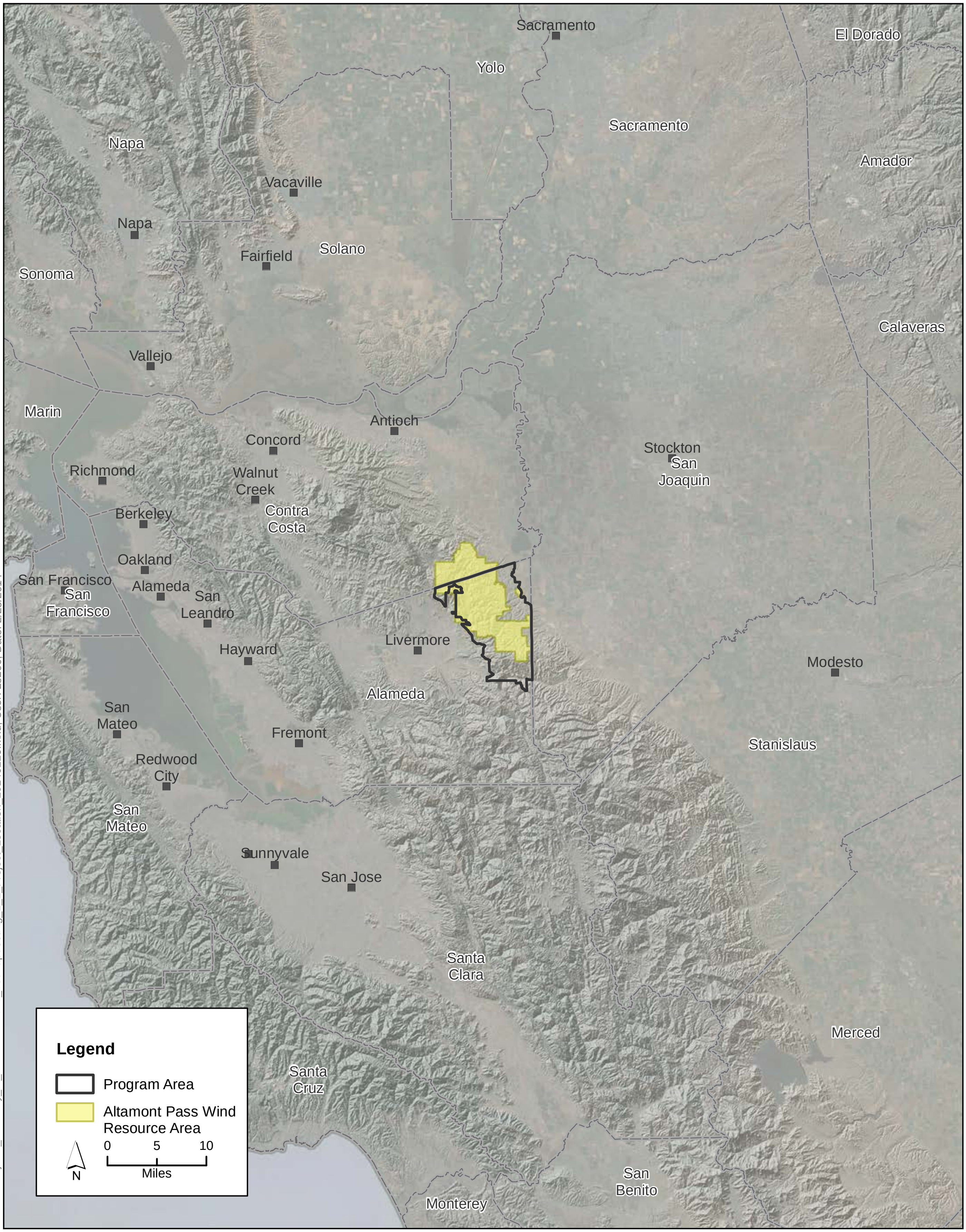
Appendix F, *Historical Documents*, contains the Draft Avian Protection Plan, the 2007 Settlement Agreement, the 2010 Settlement Agreement, and the Scientific Review Committee's Turbine Siting Guidelines.

Appendix G, *Shadow Flicker Analysis*, is the report of the shadow flicker analysis conducted for the Golden Hills Project.

1.6 References Cited

Alameda County. 1998. *Draft Environmental Impact Report—Repowering a Portion of the Altamont Pass Wind Resource Area*. August. State Clearinghouse #98022024. Hayward, CA: Alameda County Community Development Agency.

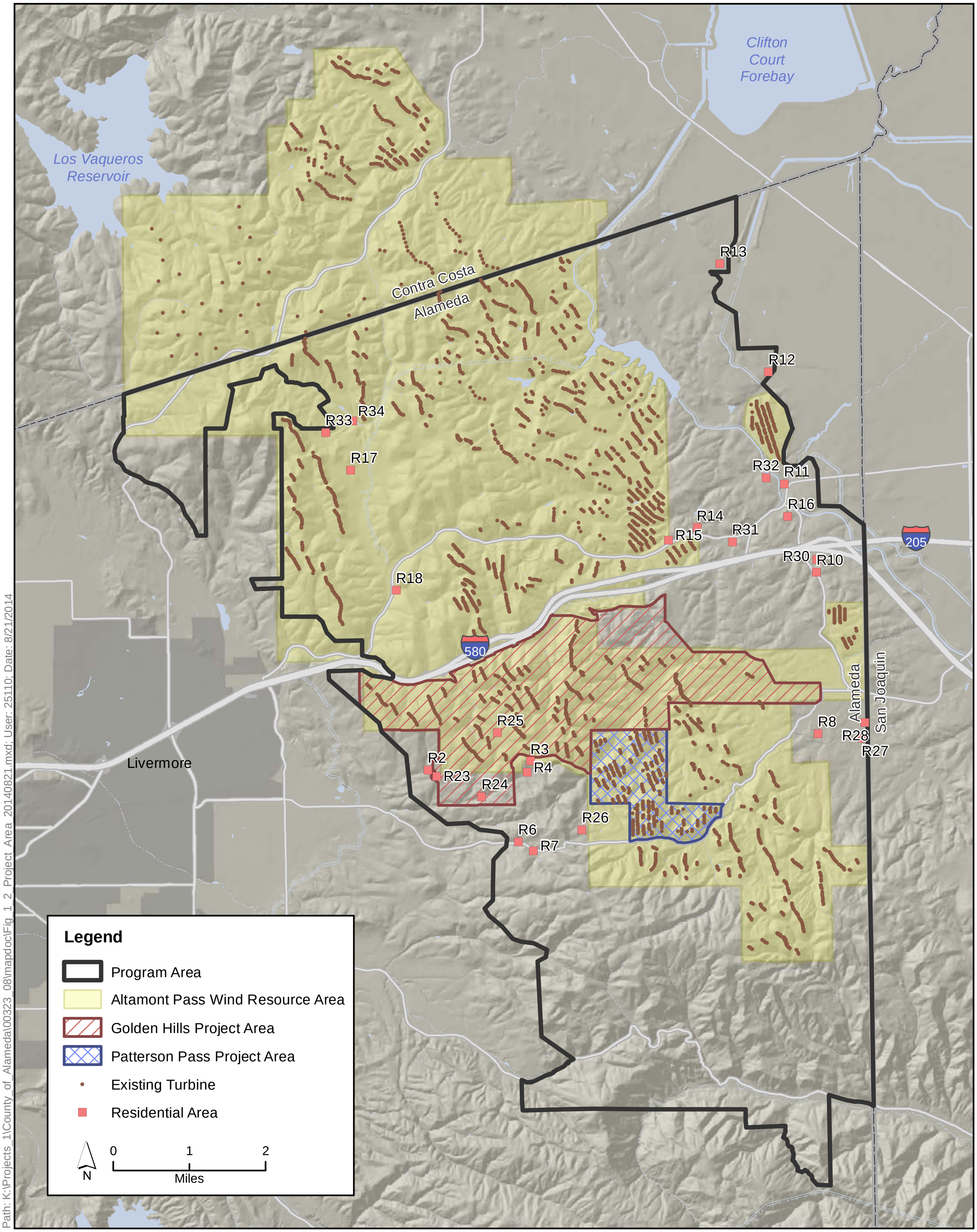
———. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.



Path: K:\Projects_1\County_of_Alameda\00323_08\mapdoc\Fig_1_1_Project_Location_20140220.mxd; User: 28266; Date: 2/25/2014

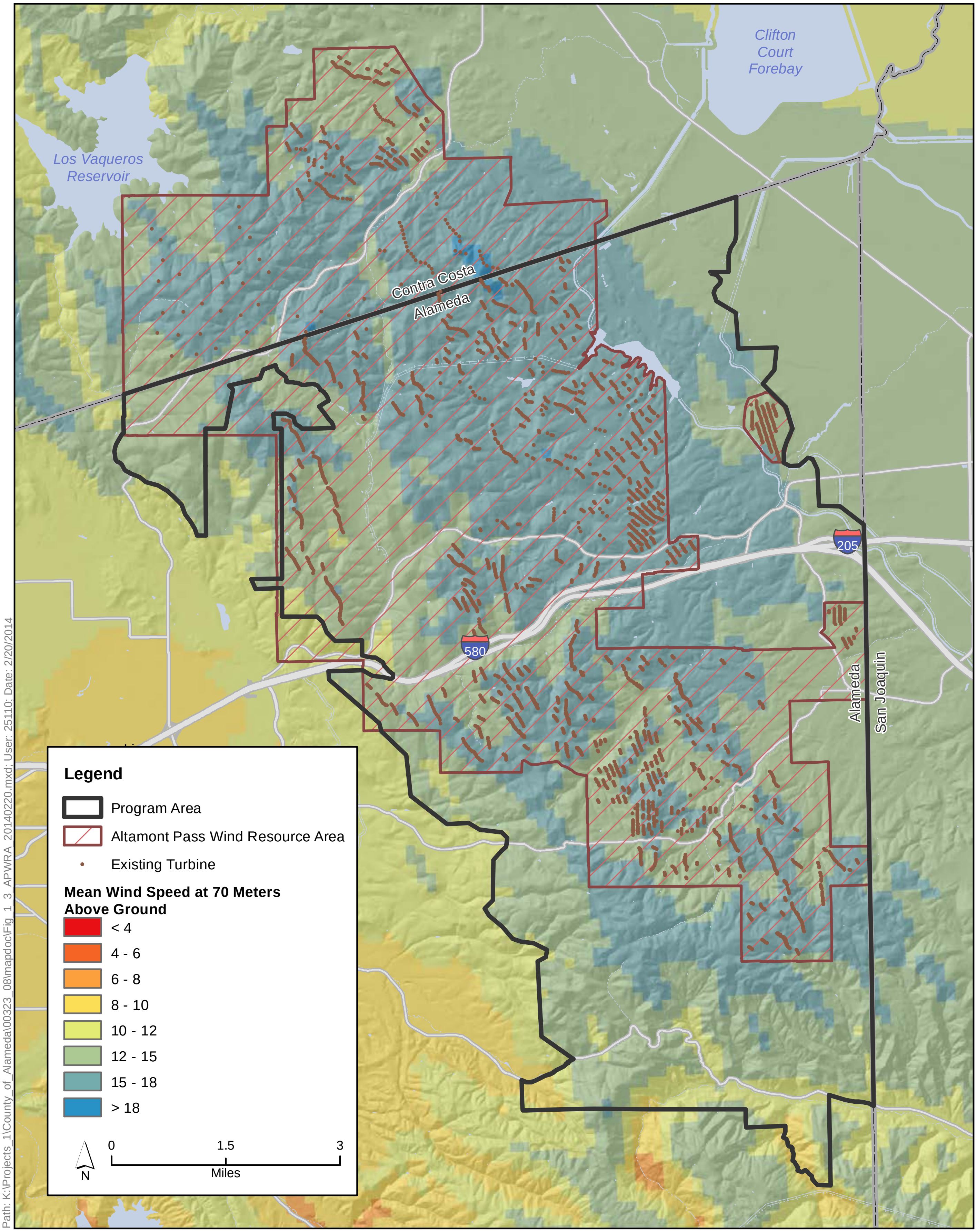
Altamont Pass Wind Resource Area
Repowering Program

Figure 1-1
Program Area Location



Altamont Pass Wind Resource Area
Repowering Program

Figure 1-2
Program Area



Path: K:\Projects_1\County_of_Alameda\00323_08\mapdoc\Fig_1_3_APWRA_20140220.mxd; User: 25110; Date: 2/20/2014

Altamont Pass Wind Resource Area
Repowering Program

Figure 1-3
Altamont Pass Wind Resource Area

Chapter 2
Program Description

2.1 Program Location and Program Area

The program area is located in the Altamont Hills of eastern Alameda County near the San Joaquin County line, north and south of I-580 and approximately 56 miles east of San Francisco. The Altamont Hills are at the geographical interface between the coastal mountains and the Central Valley (Figure 1-1).

As defined in the Alameda and Contra Costa County general plans, the APWRA encompasses approximately 49,202 acres: 36,870 acres in Alameda County and 12,332 acres in Contra Costa County. During early development of the APWRA NCCP/HCP, a new boundary for the APWRA was developed using the 70-meter wind speed data produced by CEC. The purpose of this revised boundary was to capture the extent of the area within which repowered wind turbines could be constructed. In Contra Costa County, the line was defined to match the boundary in the County of Contra Costa general plan. In Alameda County, the boundary was defined to encompass all of the County-designated APWRA, as well as those lands in the Altamont Hills with a mean wind speed of 12 miles per hour or greater, measured 70 meters (about 230 feet) above ground. Because it is anticipated that repowered wind turbines may be constructed anywhere within this revised boundary, the NCCP/HCP boundary in Alameda County (43,358 acres) is used to define the program area for this environmental analysis (Figures 1-2 and 1-3).

2.2 Program Overview and Objectives

2.2.1 Overview

This Draft PEIR evaluates repowering wind energy projects in the Alameda County portion of the APWRA. The program does not reflect any formal ordinance or adopted plan of the County, but is rather the overarching process by which the County will receive and review CUP applications. Accordingly, the program as considered in this PEIR comprises the anticipated approval by the County of a series of new CUPs to allow new windfarm uses in the APWRA, as permitted by both the ECAP and the County Zoning Ordinance. The program is the result of a combination of formal and informal agreements between the County, the windfarm operators, state and federal resource agencies, nongovernmental organizations, and property owners to initiate repowering activities in 2014 in anticipation of expiration of the existing CUPs.

Windfarm uses are conditionally permitted in the “A” (Agriculture) zone district, which encompasses the entire program area. Windfarm uses have been permitted in the APWRA since the early 1980s with such CUPs, and the terms of the currently active CUPs (last approved in 2005 for continued operation of the windfarms, and amended in 2007) are in effect through September 2018.

EBZA is the appointed body with the responsibility for taking action to approve or deny each CUP application, based on findings that the use (a) is required by the public need; (b) will be properly related to other land uses and transportation and service facilities in the vicinity; (c) will, under its particular circumstances and conditions, have no material adverse effect on the health or safety of persons residing or working in the vicinity, or be materially detrimental to the public welfare or injurious to property or improvements in the vicinity; and (d) will not be contrary to the specific intent clauses or performance standards established for the Agriculture zone district. In addition, because issuance of the CUPs qualify as projects subject to CEQA, EBZA must make required findings for each CUP that changes to the projects have been required or incorporated into their design (i.e., mitigation measures) that would avoid or substantially lessen their environmental effects, along with other required findings regarding responsible agencies, the feasibility of other mitigation measures, or alternatives to the projects.

The original CUPs (1980s and 1990s) were issued to windfarm operators on specific parcels under specific owners, in some cases allowing two or three operators on a single parcel. Individual CUPs renewed in 2005 were issued to operators according to property owner, and an operating entity (Altamont Infrastructure Company) was permitted to manage turbines owned by different operators on single parcels and also to hold single CUPs for multiple operators on individual parcels.

Under the program, CUPs would be issued directly to windfarm operators only for their operations throughout the program area—in some cases, on multiple properties. Accordingly, such operations may be separated chronologically (i.e., by phases of development) or geographically (e.g., by physical boundaries such as Interstate [I-] 580 or by intervening properties) and would warrant issuance of separate CUPs. In some circumstances, although two or more operators could manage turbines on the same property, individual CUPs would be issued to only one operator at a time.

2.2.2 Program Objectives

The two primary objectives of repowering are to facilitate efficient wind energy production through repowering and to avoid and minimize impacts on terrestrial and avian wildlife caused by repowered wind turbine construction, operation, and maintenance. Specific objectives are listed below.

- Allow for appropriate and compatible repowering and operation of wind turbines consistent with existing repowering timeline requirements set forth in the existing CUPs, related agreements, and project-specific power purchase agreements.
- Reduce avian mortality caused by wind energy generation in the program area through repowering.
- Meet the County's goals to provide environmentally sensitive, clean-renewable wind energy for the twenty-first century as identified in the ECAP (Policies 168–175 and Programs 73–76).
- Help meet the Governor's Executive Order S-14-08 in meeting the Renewables Portfolio Standard (RPS) target that all retail sellers of electricity serve 33% of their load with renewable energy by 2020.
- Contribute to state progress toward air quality improvement and greenhouse gas emission reduction goals, as set forth in Assembly Bill 32.
- Improve habitat quality in the program area through removal of roads and existing wind turbines and their supporting infrastructure, resulting in lower overall operational footprint, and providing a wide range of habitat benefits to sensitive terrestrial and avian species.

Additional objectives associated with specific repowering projects are discussed in Section 2.6. The objectives of the PEIR are identified in Chapter 1, *Introduction*.

2.3 Wind Turbine Technology

Because of the specialized nature of wind energy projects, it is important for the reader to become familiar with terminology used in describing and analyzing such projects.

2.3.1 Turbine Nomenclature

Wind turbine generator, wind turbine, or *turbine* refers to the entire structure that generates electricity. The primary structure comprises the *rotor*, *nacelle*, and *tower* anchored to a concrete foundation. Other turbine components include a controller; transformer; braking system; vibration, temperature, and fire detection systems; anemometer; safety lighting; and lightning protection. All turbines in the APWRA are horizontal axis turbines. A horizontal axis turbine has a propeller-type rotor, which rotates on a horizontal axis.

A *windfarm* is a grouping of wind turbines and supporting infrastructure. A windfarm comprises wind turbines, a collection system for moving electricity produced by the turbines onto the local power grid, roads to access turbines, and staging areas. The primary components of a wind turbine and its supporting infrastructure are defined below and shown in Figures 2-1 and 2-2. A summary of existing infrastructure in the program area is provided in Table 2-1.

Table 2-1. Summary of Existing Infrastructure in the APWRA

Infrastructure or Facility	Quantity
Wind turbines	4,210
Meteorological towers	75
Roads	236 miles

Turbine Types

Most of the turbines now operating in the APWRA were installed in the 1980s and represent first- and second- generation utility-grade commercial wind turbine technology, now considered old technology. The terms *first-generation*, *second-generation*, *third-generation*, and *fourth-generation* are used to group wind turbine types with similar technologies currently installed or to be installed in the program area. In this context, first-generation wind turbines are those designed and installed during the 1980s. Second-generation turbines are those designed and installed in the 1990s. Third-generation turbines are those installed in previous repowering projects that use similar design to turbines proposed for the program, but that are of smaller size (i.e., up to 1 MW). Fourth-generation turbines—those generally proposed for installation under the program, are large, 1.6–3 MW turbines. Additionally, experimental turbines may be installed on a limited basis in the program area.

Empirical evidence (ICF Jones & Stokes 2009; Smallwood and Karas 2009) suggests that windfarms utilizing third- and fourth-generation turbines may have significantly less impact on avian species than those using first- and second-generation technology (65–70% reduction) (Insignia

Environmental 2009; Smallwood and Karas 2009; Brown et al. 2013). This potential reduction is attributed to the much larger distance between the ground and the lowest point of the turbine blade, placing the rotor-swept area above the zone most used by resident birds, including small raptors. These turbines also rotate more slowly (in terms of revolutions per minute), potentially allowing birds time to maneuver away from the blades. However, because of the much longer blade length, the tip speed is usually greater on these turbines than on first- and second-generation turbines. In contrast, evaluation of mortality data collected at windfarms around the country (including in the APWRA) have suggested that current-generation turbines may lead to an increase in bat mortality (Barclay et al. 2007). Moreover, because of the scarcity of valid comparative data, uncertainty remains regarding the effects of repowering on avian and bat mortality.

Appendix A provides a summary of the turbines installed APWRA-wide as of October 2011.

First- and Second-Generation

The hub height of first- and second-generation turbines ranges from 18 to 55 meters (60 to 180 feet). These turbines have an approximate 20-year operating life (the length of time that an individual wind turbine is designed to remain in operation) with 40- to 500-kilowatt (kW) rated capacities and 20–25% capacity factors.

There are two types of first- and second-generation towers in the APWRA: lattice and tubular. Lattice towers are supported on three or four footings and have an external access ladder and control cabinet. Tubular towers constitute a single cylindrical support. Depending on the turbine model, tubular towers may house internal access ladders and electronic equipment such as controls, electric cables, ground support equipment, and interconnection equipment; however, some tubular towers have external ladders and down tower cabinets.

Third-Generation

Third-generation turbines resemble fourth-generation turbines: that is, they are larger than the first- and second-generation turbines and have three-blade rotors on tubular towers. Only two windfarms in the APWRA have installed third-generation turbines: Diablo Winds repowering project (Diablo Winds) (located in the program area and operational since 2004) and Buena Vista repowering project (Buena Vista) (located in Contra Costa County and operational since 2006). These turbines have nameplate capacities of 0.7–1.0 MW, with hub heights of 41–68 meters (134–223 feet) and rotor diameters of 47–61 meters (154–200 feet).

Fourth-Generation

Fourth-generation wind turbines anticipated to be installed by the project applicants have an approximate 25- to 30-year operating life and a 1.6–3 MW rated capacity. The hub heights are approximately 80–96 meters (262–315 feet), the rotor diameters are 82.5–125 meters (271–410 feet), and the rotor-swept areas are 5,356–12,259 square meters (57,652–131,955 square feet, or approximately 1–3 acres). The total turbine heights from the ground to the tip of the blade at the 12 o’clock position are 121–153 meters (397–502 feet). One repowering project in the APWRA has been installed with this category of turbine: the Vasco Winds repowering project (Vasco Winds) (in Contra Costa County, outside the program area), which was completed in May 2012.

Experimental Designs

Several types of turbines have proven to be less efficient or impractical in the APWRA. For example, a Darrieus wind turbine, commonly called an "eggbeater," is a vertical axis wind turbine (VAWT), which does not need to be oriented into the wind to be effective and can use wind from all directions. While the eggbeater design is generally more efficient than other types of VAWTs, its drawbacks are that it is not very reliable, is less efficient than the more commonly used horizontal axis wind turbines, and is more costly to construct. Additionally, it requires an external power source to start turning and cannot be activated solely by wind.

Though other experimental technologies are in development, only one is the subject of a current application with the County for installation in the APWRA: a shrouded turbine design proposed by Ogin, Inc., for installation—initially on a trial basis—in the Sand Hills Wind Project. The shrouded turbine is characterized by two concentric shrouds surrounding the turbine face and rotor: an inner and an outer shroud with an aerodynamic design intended to improve energy production compared to conventional turbine designs, as well as to reduce avian and bat fatalities. These turbines would be placed on 37-meter (121-foot) monopole towers, with the top of the outer shroud at 58 meters (198 feet).

Energy Output

The wind turbine energy output is quantified in terms of *rated capacity*, *capacity factor,* and *installed capacity*.

- **Rated capacity.** The theoretical measure of maximum power output of an individual wind turbine when operating at its rated wind speed (e.g., 1.6 MW at 11 meters per second). Also known as the nameplate capacity.
- **Capacity factor.** The ratio of actual energy output to the rated capacity over a specific time period, usually 1 year.
- **Installed capacity.** The summed rated capacity of all turbines installed in a given location (e.g., the program area).

Wind Energy Nomenclature

The following is a list of terms pertaining to wind turbines and associated facilities (in alphabetical order for ease of reference). A summary of windfarm infrastructure in the program area is provided in Table 2-1.

- **Address.** The *address* is a unique site identification for each turbine installed in the APWRA.
- **Collection system.** The *collection system* moves electricity generated by wind turbines to an electrical substation. A collection system is composed of overhead and underground low and medium voltage lines (collection lines), transformers, and a substation (Figure 2-3).
- **Down tower cabinet.** The *down tower cabinet* houses the equipment that controls how the wind turbine works (Figure 2-4). It is either placed on the pad beneath or adjacent to the tower or is housed within the tower. Down tower cabinets for existing turbines are approximately 0.6–2 meters tall by 1 meter wide by 0.3 meter deep. Down tower cabinets for current-generation turbines installed during repowering will be within the towers.

- **Power poles.** A generic term for poles that hold overhead lines or other devices necessary for the collection of electricity from wind turbines. These include riser poles, line poles, corner poles, and poles with pole-top transformers, capacitor banks, or metering sets.
- **Foundation.** The tower is bolted to a reinforced concrete *foundation* that anchors the wind turbine to the ground. Foundation types and dimensions vary depending on the turbine capacity, tower type, soil substrate, and topography. In general, foundations fall into two different types: *spread footing* or *pier* (Figure 2-4).

  A spread footing foundation is a reinforced concrete pad placed at ground level. The weight of the foundation anchors the wind turbine in place. For a lattice tower, either a single pad secures all footings, or each footing has its own pad. In some cases, a combination of a spread footing and pier foundation may be used.

  A pier foundation is a cylindrical reinforced concrete tube buried underground. Unlike a spread footing foundation, friction helps to hold the wind turbine in place, rather than weight alone. For a lattice tower with a pier foundation, each of the footings has its own foundation. For a tubular tower, a single pier foundation is installed beneath the tower base.
- **Guy wires.** *Guy wires* are wire cables that secure meteorological towers to the ground (Figure 2-5).
- **Low-voltage lines.** *Low-voltage lines* are underground collection lines of less than 600 volts that connect each wind turbine to a transformer that supports one or several wind turbines. In repowering projects, all collection lines will be constructed underground.
- **Medium-voltage lines.** *Medium-voltage lines* are collection lines between 601 volts and 35 kilovolts (kV) that connect single or multiple transformers to a substation or *utility connection point*. Medium-voltage lines may be buried or carried on overhead poles. If the lines are buried, at least one riser pole is required to link the lines with the substation. In repowering projects, all collection lines will be constructed underground whenever possible. Any medium-voltage lines constructed above-ground will conform to Avian Power Line Interaction Committee (APLIC) standards.
- **Meteorological towers.** *Meteorological towers* (Figures 2-5 and 2-6) are used to measure wind speeds and sometimes wind direction. Meteorological towers in the program area are 18.3–42.7 meters (60–180 feet) for first- and second-generation projects and 50.3–54.9 meters (165–180 feet) for the Diablo Winds repowering project. It is assumed that the height of meteorological towers for other repowering projects would be approximately the hub height of the new turbines (80–96 meters [262–315 feet]). Some meteorological towers are freestanding, whereas others are stabilized using guy wires. Permanent meteorological towers in the program area are usually sited just upwind of one or more turbines, approximately 4.6–9.2 meters (15–30 feet) in front of the turbines. Meteorological towers for repowering projects are typically used for reference and do not need to be placed so close to the turbines. Temporary meteorological towers are typically installed at a potential repowering site to measure wind speed and estimate site production capacity.
- **Nacelle.** The *nacelle* is the housing for the *main shaft, gearbox*, *generator*, *braking system*, and various control equipment. It protects the turbine mechanics and electronics from environmental exposure, comes in a variety of shapes, and is typically located behind the rotor. Most current wind turbines use an *upwind* turbine design, in which a yaw system is mounted between the nacelle and the top of the tower. This functions to keep the turbine rotor pointed

into the wind (in front of the tower; Figure 2-7). In the program area, most of the old-generation lattice tower turbines use a *downwind* design with no yaw motor, where the nacelle acts as a wind vane and the rotor operates behind the tower. The *main shaft* connects the blades to the *gearbox.* The gearbox houses the gears that connect the low-speed shaft to the high-speed shaft. It is here that the rotational speed of the rotor is increased to allow electricity to be produced by the *generator*. The *braking system* includes a disk brake that can be applied mechanically, electrically, or hydraulically to stop the rotor.

- **Pad.** The *pad* is the disturbed area, typically gravel or dirt, that encompasses the foundation, down tower cabinet, tower, and flat access areas for service trucks and mobile crane work (Figure 2-8).

- **Permanent staging areas.** *Permanent staging areas* (also called *lay-down areas*) are permanent onsite storage and work areas adjacent to existing roads. These areas serve to store equipment used for operation and maintenance of existing wind turbines (e.g., blades and nacelles) or to temporarily store parts that have been removed.

- **Riser pole.** *Riser poles* are wooden poles that connect underground medium-voltage lines to the central overhead collection lines en route to the substation.

- **Roads.** In the program area and on the private properties that contain the windfarms, there are three types of roads: *main roads*, *service roads*, and *finger roads* (Figure 2-8). Main roads are accessed from public paved roads through gated entrances to the wind farms. At each gated entrance, an asphalt apron extends approximately 6 meters (20 feet) to the gate on the main road from the public paved road. Aside from this asphalt apron, the main roads are gravel. Main roads are wide enough to accommodate two-way traffic. Service roads are narrower, gravel roads that branch off from the main roads and run the length of a turbine string. These roads allow for single vehicle travel. Finger roads are mostly short spur roads that branch off from the service roads to access each wind turbine not accessed directly from the service road. Road networks associated with repowering projects may not contain finger roads.

  Main roads typically consist of a 5.5-meter-wide (18-foot-wide) gravel bed with a 1.2-meter (4-foot) shoulder on either side. Service roads typically consist of a 4.9-meter-wide (16-foot-wide) gravel bed with a 1.2-meter (4-foot) shoulder on either side. Finger roads are graveled or dirt tracks the width of a truck, approximately 2.4 meters (8 feet) wide, with no shoulder.

- **Rotor.** The *rotor* is the portion of the wind turbine acted on by the wind. It consists of *blades* and the *hub* to which the blades are attached (Figure 2-7). The hub is the connection point between the blades and the main shaft, which is housed within the nacelle. The *turbine height* refers to the distance from the blade tip at 12 o'clock to the ground (Figure 2-2). Third- and fourth-generation turbines include blade pitch controls that regulate the angle of the rotor blade into the wind; this feature is used to control rotor speed and shutdown or slowdown in response to excessive wind speed, to reduce risk of avian mortality, and to increase turbine speed to improve efficiency in conditions of light winds.

- **String.** A *string* is one or more wind turbines in a row (Figure 2-8). First- and second-generation wind turbines are typically grouped in strings to maximize the energy generation where wind comes predominantly from one direction. Third- and fourth-generation turbines are not typically placed in strings because of their large size, required setbacks, and constraints associated with topography and property boundaries.

- **Substation.** A *substation* is the facility where the voltage level of the collection system is stepped up, by means of transformers, to that of the power grid.
- **Tower.** The *tower* elevates and supports the rotor and nacelle. Towers are either of lattice or tubular design (Figure 2-1).

2.4 Operation of Existing Turbine Facilities

The 2005 CUPs (including the 2007 CUP amendments) required that this PEIR address the "continued operation of existing turbine facilities (and progressive removal under the repowering program)." Existing turbine facilities will continue to be operated consistent with the 2005 CUPs (and the 2007 CUP Amendments) until such time as each site is repowered or decommissioned (under the 2007 CUP Amendments, the Settling Party Wind Companies are not subject to the removal schedule originally imposed by the 2005 CUP conditions). This section describes all activities associated with the 2005 CUPs that are ongoing for the life of each 2005 CUP—operation of turbines, operation of associated facilities, maintenance of turbine facilities, and site reclamation as required by the 2005 CUPs.

2.4.1 Turbine Operation

As of October 2011, there were approximately 3,490 wind turbines of 11 different types in the APWRA across both Alameda and Contra Costa Counties. This total comprises first-, second-, and third-generation wind turbines (Appendix A).

The operation of turbines is subject to several variables: wind conditions, maintenance needs, and operational requirements for seasonal shutdown and decommissioning as described in the 2005 CUPs. The minimum speed required for a wind turbine to start is called the *cut-in speed*. A command to start up the turbine can be initiated automatically by a sensor on the turbine, or the command can be sent manually from a central location (i.e., wind power company office). For first-generation turbines in the APWRA, the minimum cut-in speed is 4–6 meters per second.

The *cut-out speed* is the maximum speed at which a turbine operates. Winds exceeding the cut-out speed—or an internal fault—should cause a wind turbine to turn off. The cut-out speed of first-generation wind turbines in the APWRA is 20–25 meters per second. A wind turbine is considered a *runaway* when it is in an uncontrolled state. Any wind turbine can be manually turned on and off unless it is in a runaway state. Maintenance is conducted on runaways to bring them back into a controlled state, or the turbine is monitored until failure or the blades stop moving (when wind stops).

Since approval of the CUPs in 2005, the windfarms have operated under an Avian Wildlife Protection Program & Schedule (AWPPS, Exhibit G of the CUPs) that required the windfarms to cease operations during the peak wintertime avian migration periods, beginning with 2-month shifts of one-half of the turbines at a time. This schedule increased to the current requirement for an area-wide 3.5-month shutdown from November through mid-February. The AWPPS also required shutdown and removal (decommissioning) or relocation of high-risk turbines, and progressive removal of first- and second-generation turbines in advance of anticipated repowering.

2.4.2 Other Turbine Facility Operations

Other turbine facility operations includes operation and/or use of permanent and temporary staging and laydown areas; use of permanent and temporary meteorological towers; and use of substations, above- and belowground collection lines, power poles, and roads.

2.4.3 Wind Turbine Removal and Relocation

This activity only applies to first- and second-generation wind turbines. Reasons for wind turbine removal and relocation are varied. Some wind turbines may be in locations identified as risk areas. High-risk areas are those areas identified as having demonstrated potential high avian mortality by the Alameda County Scientific Review Committee (SRC) in a series of reports (Alameda County Scientific Review Committee 2007, 2008a, 2008b, 2008c; Smallwood 2008). Relocation is also undertaken to allow wind companies to maintain or increase the number of high-output sites. High-output sites are sites with higher wind speeds and/or long wind duration where more wind energy can be generated. For example, an existing wind turbine may be relocated from a low-output site to a high-output site for use through the end of the permit term (2018).

This activity can entail either partial or full removal of the nacelle (including blades and rotor), and installation and/or replacement of the nacelle components on an existing tower. Alternatively, it can entail removal of a wind turbine (tower, nacelle, and rotor) from one address and its relocation to another where a wind turbine has been removed. No new meteorological towers, new roads, or road infrastructure upgrades are required for removal or relocation of first- or second-generation turbines. Existing laydown areas are used for the main staging area; existing collection and communication systems may be used.

2.4.4 Maintenance

Wind companies operating in the program area conduct regular maintenance on turbines to ensure proper operation. These activities are described below.

Scheduled and Unscheduled Maintenance

Turbines and other structures require routine scheduled and unscheduled maintenance. Turbine manufacturers' guidelines dictate that regularly scheduled maintenance of windfarm facilities occur twice yearly. Scheduled maintenance typically occurs according to these requirements. Unscheduled maintenance is estimated to occur two times annually for each first- and second- generation turbine. A single turbine may be serviced as many as four times per year.

Routine maintenance activities include turbine lubrication, part replacement, turbine torque checks, making records of failures, sweeps of turbines (e.g., maintenance assessments, check-ups) that have reached a certain age, and other maintenance procedures. Turbine addresses are accessed by the existing network of main, service, and finger roads in the program area. Maintenance vehicles usually stay on designated roads. Offroad travel is infrequent, limited to maintenance of power poles, collection lines, and transformers. If a blade is lost on a first-generation wind turbine, offroad travel is occasionally required to retrieve the blade.

Scheduled maintenance occurs year-round, mostly from November 1 to March 31 during the winter low-wind season. Unscheduled maintenance occurs year-round, mostly April 1 to October 31 during the summer wind season.

Collection Lines

Most collection lines for first- and second-generation turbines are underground along turbine string roads to a turbine string transformer and then to an overhead collection line; the overhead collection line conveys power to the project substation. Aboveground lines not accessible by vehicle are accessed by foot when necessary. Aboveground collection lines are visually inspected annually. During this annual inspection, wildlife boots and other avian electrocution protection devices are checked, and missing or damaged devices are replaced. Some ground disturbance may result from vehicular and foot access.

Infrared scans are used annually to inspect overhead collection lines during online production (i.e., summer wind season). Replacement of underground lines occurs infrequently and is limited to the location where repair is required. The underground cables are trenched and replaced. The length of trench required for this activity ranges from 20 to 200 feet.

Occasionally wind companies are also responsible for maintaining a short segment of transmission line between a project applicant substation and a Pacific Gas and Electric Company (PG&E) substation.

Road Maintenance

All the roads maintained by the wind companies in the program area—main roads and service roads—are gravel. Finger roads are not regularly maintained, but they may be cleared of grass annually for fire prevention. Pavement is limited to a concrete apron extending 75–100 feet from the public road to the main road at each gated entrance.

Road maintenance typically consists of patching potholes, placing rocks (i.e., spot rocking), and minor regrading. Spot rocking is done to strengthen and protect drainage outlets and inlets for culverts and other drainage structures (e.g., ditches, berms). Grading may be conducted for as little as 6 meters to several kilometers at a time.

Road maintenance is performed with a grader, a dump truck to disperse roadbase rock, and a roller to compact it. When needed, a bulldozer is used to clear roads where a grader cannot gain access or where the necessary road maintenance exceeds the grader's capability (e.g., due to a landslide). In general, roadside maintenance activities may involve soil disturbance in a strip along the road with an average width of 4 feet on either side of the road (i.e., graded shoulder). Roads in steep areas may require maintenance activities that extend farther from the road—up to a maximum of 26 feet in areas of slopes greater than 25%. In most cases, the roads are maintained to bank to the inside to reduce potential erosion problems.

Road maintenance also includes cleaning (manually and mechanically), repairing, and replacing culverts as needed. Culverts in the program area range from 1.5 to 6 feet in diameter. Hand labor and backhoes are used to maintain culverts. Culvert repair and maintenance may affect areas as far as 8 meters from the edge of the road. New culverts may be installed as part of new road construction or to enhance road drainage for reducing erosion. Winged inlet structures, consisting of cement or rock wings flanking a ditch or culvert inlet, may also be repaired or installed to prevent erosion and improve passage of woody debris through drainage inlets.

Repairs are conducted as needed throughout the year, but generally occur between April and October, after the spring rains and before the winter wet season. Road maintenance activities typically occur throughout the entire road system once every 2 years, although some portions of the system rarely, if ever, require maintenance while other portions require maintenance one or more times each year.

Fire Prevention

Exhibit C of the 2005 CUPs describes the Altamont Pass Wind Farms Fire Requirements. Fire prevention is required as part of the County's CUPs. The main mechanism for fire prevention is the maintenance of a 30-foot-wide firebreak around buildings and structures, including turbines, riser poles, and substations. Firebreaks around turbines may surround a turbine string rather than individual turbines. Electrical lines require a 20-foot clearance of flammable vegetation. In the APWRA, vegetation management is accomplished by application of herbicide in October or November. Provision of a yaw damper or other approved method to prevent the over-twisting of pendent cables helps prevent turbine fires.

Existing firebreak requirements are based on first- and second-generation turbines, which present greater risk of fire ignition than do current-generation turbines.

2.4.5 Site Reclamation

The 2005 CUPs required that wind companies remove all facilities and restore properties to preinstallation conditions if windfarm operations cease, or if wind companies fail to implement the terms and conditions of the 2005 CUPs, including requirements to repower, unless an exception is made by the County Planning Department, or unless the resource agencies (USFWS or CDFW) require that such facilities be left in place.

If a repowering project is implemented, site reclamation is typically undertaken after the repowered turbines are installed and all temporary equipment and infrastructure is removed from that area. If a repowering project is not implemented, site reclamation would be undertaken after all turbines have been decommissioned and removed. Roads that are no longer required because turbines have been removed and that are not wanted by landowners would also be reclaimed unless a resource agency (e.g., U.S. Fish and Wildlife Service [USFWS], California Department of Fish and Wildlife [CDFW]) require that they not be reclaimed. New or widened roads that were installed to accommodate construction of new turbines may be restored to a narrower width after turbine installation is complete.

Reclamation activities entail returning lands disturbed by infrastructure installation or removal to preproject conditions. Some facilities (e.g., roadways, turbine footings) may be left in place if doing so is deemed to be more protective of natural resources than removal. At each reclamation site, the entire site is contour graded (if necessary) to conform with the natural surrounding topography and reseeded with an appropriate seed mixture, unless the resource agencies request that contouring not be undertaken. No soil is removed from the site. Figure 2-9 shows reclamation of a turbine pad site. Exceptions to returning a site to preinstallation conditions may be made, upon approval of the County Planning Department, if such reclamation activities would or could create water quality issues (e.g., erosion) or if the activities may adversely affect special-status species (e.g., burrowing owl burrow complexes, upland habitat for California red-legged frog or California tiger salamander). Moreover, CDFW and USFWS have suggested that it may sometimes be preferable to avoid regrading roads or removing foundations to avoid disruption of such habitats. In such cases, the County Planning Department could change reclamation requirements accordingly.

2.5 Proposed Repowering

As mentioned in Chapter 1, *Introduction*, two repowering alternatives have been identified for analysis: Alternative 1, with a maximum capacity of 417 MW; and Alternative 2, with a maximum capacity of 450 MW. With the exception of the nameplate capacity and the resultant total number of turbines (i.e., approximately 260 turbines under Alternative 1 and 281 under Alternative 2), the two alternatives are identical in the context of the description presented below.

The description of the proposed program addresses the components listed below.

- Repowering timeline.
- Siting conditions.
- Repowering activities.
- Operations and maintenance (O&M) activities.

This PEIR is intended to facilitate the permitting of repowering projects in the program area.

2.5.1 Repowering Timeline

Once CEQA compliance is completed and new CUPs are approved, buildout of repowered windfarms is expected to take place over a 4-year period (ending on September 22, 2018, when all 2005 CUPs expire). This schedule would allow time for completion of other design and permitting activities (1–2 years); wind turbine procurement and other long-lead items (12–18 months, but overlapping with the last year of permitting activities); and construction (8–12 months). The duration of repowering project construction depends on the number of turbines repowered and the ease of access to the site. Construction time encompasses all the activities described in Section 2.5.3 with the exception of temporary meteorological tower installation. Not all repowering projects would be initiated simultaneously, but most would be expected to be under construction by the end of year 4.

CUPs will be issued for a period of 30 years. This permit term is based on the expected operating life of current-generation turbines, landowner leases, and power sales agreements. Review periods will occur at years 4, 13, and 23 consistent with finalization of reporting associated with postconstruction monitoring conducted for the first 3 years of operation, and then for 2 years beginning at years 10 and 20 of operation. During review periods, the County may examine the most current mortality data and require adaptive management measures as set forth in Section 3.4, *Biological Resources*.

2.5.2 Siting Conditions

Turbine siting depends on a number of factors. Perhaps the two most important factors are potential energy production capacity (based on wind speed and direction) and avoidance of high-risk areas for avian species. Setback requirements are often defined for human safety, specifying minimum distances from residences, roads and highways, utilities, other windfarms, property boundaries, and railroads. Potential visual impacts, including flicker effects, are also considered. No existing residences would be demolished to make room for new turbines. County setback and technological requirements are discussed below.

County Requirements

Setback requirements were originally developed for Alameda County windfarms in the 1980s and 1990s in consideration of a variety of factors, such as appropriate distance between upwind and downwind turbines for effective wind production, noise effects on sensitive land uses, visual impacts resulting from proximity to residences and possible shadow flicker, concerns with tower collapse, and blade throw hazard (where all or part of a rotor blade may break loose from the nacelle and strike an occupied area or infrastructure). While there is no ordinance dictating setback conditions in Alameda County, setbacks have historically been determined on a project-by-project basis in accordance with the standard conditions of approval for a CUP. However, while the standard conditions applied in the 1980s and 1990s were appropriate for the older generation turbines, they may not be so for the fourth-generation turbines proposed for repowering. Accordingly, the County has developed a set of updated standards to be used for proposed repowering projects. These are shown in Table 2-2.

Table 2-2. Updated Alameda County Turbine Setback Requirements

Affected Land Use or Corridor	General Setback	Setback Adjustment for Turbine Elevation Above or Below Affected Use[a]	Alternative Minimum[b]
Adjacent parcel with approved wind energy CUP[c]	1.1 times rotor length	1% TTH added or subtracted per 10 ft. of turbine elevation, respectively, above or below affected parcel	50% of general setback
Adjacent parcel without approved wind energy CUP	1.25 times TTH	1% TTH per 10 ft above or below affected parcel	1.1 times rotor length
Adjacent dwelling unit	3 times TTH	1% TTH per 10 ft above or below affected unit	50% of general or elevation differential setback
Public road (including I-580), trail, commercial or residential zoning	2.5 times TTH	1% TTH per 10 ft above or below affected right-of-way	50% of general setback with report by qualified professional, approved by Planning Director
Recreation area or property	1.25 times TTH	1% TTH per 10 ft above or below affected property	TTH
Transmission line[d]	2 times TTH	1% TTH per 10 ft above or below path of conductor line at ground level	50% of general setback with report by qualified professional, approved by Planning Director

Affected Land Use or Corridor	General Setback	Setback Adjustment for Turbine Elevation Above or Below Affected Use[a]	Alternative Minimum[b]

Note: TTH = total turbine height: the height to the top of the rotor at 12:00 position. Setback distance to be measured horizontally from center of tower at ground level.

[a] The General Setback based on TTH will be increased or reduced, respectively, based on whole 10-ft increments in the ground elevation of the turbine above or below an affected parcel, dwelling unit, road right-of-way, or transmission corridor conductor line. Any portion of a 10-ft increment in ground elevation will be disregarded (or rounded down to the nearest 10-ft interval).

[b] *Alternative Minimum* refers to a reduced setback standard, including any adjustment for elevation, allowed with a notarized agreement or an easement on the affected property, subject to approval of the Planning Director.

[c] No setback from parcel lines is required within the same wind energy CUP boundary. Knowledge of proposed wind energy CUPs on adjacent parcels to be based on best available information at the time of the subject application.

[d] Measured from the center of the conductor line nearest the turbine.

Turbine and Wind Resource Requirements

For a variety of reasons, repowered wind turbines will be installed at new addresses in different locations than the existing wind turbines. Spacing requirements, topography, and the necessity to avoid high-risk (for avian mortality) sites also guide where repowered turbines would be sited. Detailed turbine siting is determined by wind resource availability, turbine type, topography, setback requirements, and location of sensitive resources. New turbines would be spaced more widely and individually than under the current approach of arranging turbines in strings. Three factors contribute to this spatial approach.

- Current-generation turbines are vastly more efficient and productive than first- and second-generation turbines, necessitating far fewer turbines to achieve the same installed capacity.
- Current-generation turbines require considerable space to avoid wind turbulence affecting downwind turbines
- The new larger turbines may require greater distances from the program area perimeter than existing turbines.

Distances between turbines are site/project specific and are stipulated by the turbine manufacturer. For example, a turbine manufacturer may recommend specific turbine spacing to achieve the installed capacity. Minimum lateral spacing between turbine towers is typically three times the rotor diameter. Downwind spacing is typically 8–12 rotor diameters. Accordingly, repowered turbines are expected to have 141- to 277.5-meter lateral spacing and 376- to 1,110-meter downwind spacing.

2.5.3 Repowering Activities

A repowering project typically includes the following major steps.

- Temporary meteorological tower installation.
- Temporary staging area set-up.
- Existing wind turbine removal.

- Temporary meteorological tower removal.
- Road infrastructure upgrades.
- Wind turbine construction.
    - Final site selection and preparation.
    - Batch plant construction.
    - Foundation excavation and construction.
    - Crane pad construction.
    - Tower assembly.
    - Installation of turbine nacelle.
    - Attachment of rotors.
- Collection system upgrades and installation.
- Communication system installation.
- Permanent meteorological tower installation.
- Reclamation of landscape.

Each of these steps is described in detail in the following sections. Equipment used for construction of all repowering activities often includes those listed below.

- Cranes.
- Lowboys/trucks/trailers.
- Flatbed trucks.
- Service trucks (e.g., pickup trucks).
- Backhoes.
- Bull dozers.
- Excavators.
- Graders.
- Dump trucks.
- Track type dozers.
- Rock crushers.
- Water trucks.
- Compactors.
- Loaders.
- Rollers.
- Drill rigs.
- Trenching cable-laying vehicles.

- Cement trucks.
- Concrete trucks and pumps.
- Small hydraulic cranes.
- Heavy and intermediate cranes.
- Forklifts.
- Generators.

For individual projects, construction activities would typically be carried out in the seven phases listed below. There would be some overlap between most of these phases; in other words, the estimated durations should not be considered to be additive; rather, the entire construction period from decommissioning through cleanup and restoration is anticipated to require approximately 9 months for a typical 80 MW project. Although the precise schedules of individual projects are anticipated to vary, the durations listed below are used to estimate impacts in the program-level analyses.

- Phase 1—Decommissioning of existing plant: 12 weeks.
- Phase 2—Laydown areas: 12 weeks.
- Phase 3—Road construction: 8 weeks.
- Phase 4—Foundations/batch plant: 16 weeks.
- Phase 5—Turbine delivery and installation: 12 weeks.
- Phase 6—Electrical trenching: 12 weeks.
- Phase 7—Cleanup: 8 weeks.

Temporary Meteorological Tower Installation

A system of temporary meteorological towers would be installed in strategic locations in advance of repowered wind turbine siting and construction. The system of meteorological towers would typically be installed for a minimum of 1 year to measure wind speed and direction to determine whether a site's potential production capacity makes it suitable for wind turbine placement. Meteorological tower height is typically equivalent to the hub height of repowered turbines. The tower consists of a 15- to 30-centimeter-diameter pole on a square pier foundation 107–152 centimeters on a side. Some meteorological towers are freestanding; others are anchored to the ground with guy wires.

Meteorological towers are typically placed in areas where grading is not required for installation. Because the data collection system is solar-powered, wireless, or battery-powered, no data or power connections are necessary. Installation requires a staging area accommodating the tower site, crane site, and pulling site. Installation occurs over the course of 1–2 days with no seasonal restrictions.

Once the meteorological towers have collected adequate information, they are removed and the site is reclaimed (see the discussion of reclamation activities below).

Contractor Yards and Staging Areas

During construction of individual repowering projects, a main contractor yard and other temporary staging areas would typically be needed. The main contractor yard would typically encompass 5–10 acres, accommodating onsite construction trailer(s), parking for project workers, machinery maintenance and servicing area, and a take-down and set-up area where both the salvage and scrap materials of removed turbines and the components of repowered wind turbines are brought and stored until their use or disposal. Two to four additional staging areas (5–10 acres) would also be necessary, typically sited adjacent to existing roads and near turbine sites. Once construction is completed, the main contractor yard and staging areas are fully reclaimed or reduced in number or size. It may be necessary to maintain a portion of the contractor yard or other staging areas to accommodate future wind turbine maintenance. Each specific project will have its own laydown and staging area requirements.

Existing Wind Turbine Removal

The program assumes that all first- and second-generation turbines will be removed from the program area by 2018. Wind turbine removal entails removal of the wind turbine (rotor, nacelle, and tower) and down tower cabinet. Removal of the collection system, including the associated transformer, is discussed in *Collection System Upgrades and Installation*.

Existing wind turbine foundations may be fully or partially removed. Trenching and backfilling is typically used to bury foundations. For example, a backhoe is used to dig a trench around each foundation. The top 2–3 feet of the foundation, including the down tower cabinet foundation at turbines with pier foundations, is broken up and either spread in the excavated area or disposed of offsite. The excavated area is then backfilled to grade with the material that was removed during trenching, with the original topsoil placed on top. Areas of steeper slopes may require deeper coverage. As noted above, some buried features may be left in place if doing so is deemed to be more protective of natural resources than removal. Where features are left in place, steel and electrical connections would be leveled and made safe.

Grading will be avoided where appropriate to minimize and avoid disturbance of wildlife burrows that have adapted to existing grade cuts. However, in some instances such grade cuts will be graded out to match the surrounding contours, if wildlife impacts can be avoided. New grading over existing foundations, equipment pads, or finger roads may be necessary for the installation of new access roads and foundation pads for repowered turbines.

Removal of existing wind turbines is typically undertaken concurrently with other repowering activities to minimize project duration. For example, if a repowering project involves the removal of 100 turbines in several distinct locations, the project could be phased such that once turbine removal is complete in one area, road infrastructure upgrades can be initiated in that area while wind turbines are removed in another. Wind turbine removal may be limited to the dry months because of the weight of turbine components and the heavy equipment used for turbine removal. All turbine removal activities will confined to small, site-specific staging areas. These staging areas will be reclaimed on completion of the repowering project.

Meteorological Tower Removal

Temporary meteorological towers set up in advance of individual repowering projects as well as existing meteorological towers at the repowering project site would be removed prior to constructing the permanent meteorological towers. Because meteorological towers typically approximate the hub height of the turbines for which meteorological data are collected, the existing meteorological towers would not suffice for the proposed repowered turbines.

Removal of meteorological towers typically includes several steps. The aboveground components of the tower are removed by cutting one leg and pushing the tower over in a predetermined direction. The foundation is excavated by digging a trench around the foundation (an approximately 4-foot radius). The top 2 feet of the foundation is broken up and buried in the trench. The foundation must be buried with topsoil at a minimum depth of 2 feet. If all the foundation material cannot be buried, it is removed from the site. Upon completion of tower and foundation removal, the excavated area is backfilled. It is anticipated that all temporary and existing meteorological towers will be removed. Once a meteorological tower is removed, the site will be reclaimed as described below.

Road Infrastructure Upgrades

Fourth-generation turbine towers and blades are significantly longer than older turbine components and require larger and longer trucks and cranes for transport and installation. These vehicles require wider roads with shallower turns and gradients than currently exist. Consequently, the existing road infrastructure must be upgraded to accommodate construction of the repowered turbines. Road infrastructure upgrades would include grading, widening, and re-graveling of the existing roads, as well as construction of new roads. Existing culverts may need to be upgraded for existing roads and new culverts may be needed for new roads.

Existing Roads

Most roads internal to the portion of the program area currently supporting wind energy development would be widened to accommodate larger towers as well as larger equipment necessary to install repowered turbines. It is likely that the locations requiring the most roadwork are those where roads curve as they climb hills to the ridgetops. In addition, each of the access road entrances would need to be widened to provide sufficient space for the minimum turning radius of construction cranes and other flatbed delivery trucks.

Public roads used to access the program area may also require upgrades and/or widening to support the weight of trucks and turbine components, as well as to allow passage of turbine components.

Culverts are generally installed as part of the road drainage system on slopes, although some are installed at small stream crossings. Existing culverts may need to be replaced with larger culverts or reinforced to provide adequate size and strength for construction vehicles.

New Roads

New service roads would need to be developed from existing main roads to access repowered turbine sites—especially those in the area between the general plan–defined APWRA and the revised program area boundary. New service roads would typically consist of a gravel roadbed and shoulders (including cut-and-fill slopes). Exact locations of the roads are not known at this time. In addition, new stormwater culverts may need to be installed as part of the new road infrastructure.

Wind Turbine Installation

Installation of repowered turbines would occur throughout the program area. A range of turbine types may be used during the course of repowering, although only one or two types of turbines are likely to be installed in any single repowering project. All are anticipated to fall within the parameters described in *Fourth-Generation Turbines* above.

Installation of wind turbines is typically limited to the dry months because of the weight of both the turbine components and the heavy equipment necessary to perform the work; however, some work not requiring heavy equipment could be performed at other times.

Foundation

The type of turbine foundation used depends on terrain, wind speeds, and wind turbine type. Figure 2-4 depicts two foundation types that may be used in the program area: an inverted "T" slab foundation and a concrete cylinder foundation.

An inverted T slab foundation is a type of spread footing foundation. A single concrete pad is placed at ground level. Part of the pad may be placed below ground level depending on the slope. At the center of the pad is a cylindrical concrete block to which the wind turbine tower is bolted; hence the name, inverted T. The diameter of the cylindrical concrete block is equivalent to the tower base diameter. The size of the concrete pad is determined by wind turbine size and site-specific conditions (e.g., expected maximum wind speeds, soil characteristics). Its weight must be sufficient to hold the wind turbine in place.

A concrete cylinder foundation is a type of pier foundation. A single hollow, concrete cylinder is placed underground. Anchor bolts run the length of the cylinder to an embedded ring at the cylinder's base. Earth fill is placed inside and outside the cylinder. The friction of the earth fill against the hollow pier holds the foundation and attached wind turbine in place. The diameter of the cylinder is slightly larger than that of the wind turbine tower base. The length of the cylinder is determined by wind turbine size and site specific conditions.

Construction

Repowered turbine construction entails placement of a new tower, rotor, nacelle, transformer, and foundation. Construction and installation of repowered turbines is regulated by existing County conditions of approval, building permit requirements, and grading permit requirements.

A crane pad area would be leveled and graded at each turbine address. The crane pad—a flat, level, and compacted area—would provide the base from which the crane will work to place the turbine. This site would also be used as a laydown area for offloading turbine components. The tower foundation would be constructed within the crane pad area. All wind turbine construction activities would occur within the crane pad area. A portion of the crane pad area may be left in place following construction for future O&M activities; the remaining area would be reclaimed.

Depending on the size and location of the repowering project, a concrete batch plant may be necessary. A concrete batch plant is a facility where concrete is mixed for turbine foundations. After construction, the site of the batch plant would be reclaimed. Smaller projects may not require batch plants; instead, the concrete would be mixed individually for each turbine within the crane pad area or mixed offsite at an existing plant. It is estimated that three to eight batch plants would be required for the overall program.

The foundation would be installed immediately adjacent to the crane pad, within the crane pad area. While the foundation type is determine by terrain, wind speeds, and turbine type, in general, the foundation is formed by placing concrete in an excavated footing with reinforced steel.

The turbine towers, nacelles, and blades are delivered to each turbine location in the order of assembly, once the concrete of the foundation has set. Onsite tower assembly reduces the need to clear additional staging areas. Large cranes are brought to each site to lift and assemble the turbine components. First, the base section of the tower is secured to the foundation. The remaining tower sections are then connected to the base section. The nacelle and rotor are delivered to the turbine site. Blades are bolted to the rotor hub, lifted by a construction crane, and connected to the main shaft.

During construction of old first-generation turbines in the 1980s, when rock was excavated for the foundation or to grade a pad, it was placed in nearby piles. Depending on siting requirements of repowered turbines, relocation of some of these rock piles may be necessary to facilitate turbine placement and construction. Moving rock piles would require use of an excavator.

Lighting

The Federal Aviation Administration (FAA) determines project-specific lighting requirements, but in general, FAA requires that a single warning light can be used for groups of turbines less than 200 feet tall. Typically, turbines taller than 200 feet must be individually lit. Consequently, because fourth-generation turbines are generally well over 200 feet in height, all repowered wind turbines would require FAA lighting. Lighting of the wind farm would be in compliance with the FAA Obstruction Marking and Lighting Advisory Circular (AC70/7460-1K). Intensity of the lights would be based on a level of ambient light, with illumination less than 2 foot-candles being normal for nighttime and illumination greater than 5 foot-candles being the standard for daytime. Because some evidence suggests that lights may be an attractant for birds during nighttime migration (Kerlinger et al. 2010), the minimum number of required lights would be used to minimize attractants for birds during nighttime migration. Through its review process, the FAA could recommend that tower markings or aviation safety lighting be installed on all or only a portion of the turbine towers. The FAA could also determine that the absence of marking and/or lighting would not threaten aviation.

Collection System Upgrades and Installation

Each new repowered wind turbine must be connected to the electrical collection system. The collection system moves electricity generated by each turbine through a low-voltage line to a transformer, which boosts the voltage and conveys the electricity to a medium-voltage line that carries the electricity to a substation. The substation is where the voltage level of the collection system is stepped up to that of the power grid. From the substation, electricity is carried through a utility interconnection point onto larger utility transmission lines that distribute electricity to the power grid. Transmission lines in the program area are maintained by PG&E. Removal of old collection lines and construction of new lines (turbine to substation) are part of the program, but construction of new transmission lines (substation to power grid) is not.

As repowering projects are implemented, the aboveground components of old collection systems would be removed and new collection systems would be installed. Each wind project would have its own electrical collection system. The program-level analysis assumes that each project would construct its own substation or upgrade an existing one. As described below, some equipment will be replaced while some will be removed and not replaced. Staging areas required for collection system installation and areas where collection system components have been removed and not replaced will be reclaimed. Each of the collection system components is discussed below.

Collection Lines

Typical construction of new collection systems requires installation of underground low- and medium- voltage lines, transformers, and at least one overhead power pole. There are several types of power poles. Line poles are used to string aboveground collection lines and only have insulating devices. Corner poles have jumper wires, are located at turns or bends in the collection system alignment, and may require guy wires. Poles with pole-top transformers, capacitor banks, and metering sets may also be used. Riser poles are used where collection lines transition from underground to an elevated, aboveground configuration where the lines enter a substation. Disconnectors, cut-outs, switches, lightning arresters, and other electrical devices may be mounted on riser poles.

Low-voltage lines connect an individual turbine or group of turbines to the transformer that supports them. Low-voltage lines range from 1 to 600 volts, and a line may range from 10 to 200 feet long. All low-voltage lines are currently underground. All new lines would also be constructed underground. Because of their age, it is unlikely that any of the existing low-voltage collection lines would be used for the repowered turbines.

Medium-voltage lines connect transformers to a substation or utility interconnection point. The medium-voltage lines are normally between 601 volts and 35 kV. Typically, construction and installation of all new medium-voltage lines would be underground wherever possible, except for their point of connection with the substation and from the substation to the interconnection point. Existing aboveground lines may also be used; however, most of the existing aboveground medium-voltage lines would be removed and not replaced. If installation of new aboveground collection line facilities is required, then it would be completed in compliance with the latest recommendations of the Avian Power Line Interaction Committee (APLIC).

Installation of underground low- and medium-voltage lines is accomplished using a cut-and-cover construction method. Typically, a minimum access width of 20 feet is required to allow for the trench excavation, but this width may vary. The length of line varies with the distance to the substation. The topsoil is separated from the subsurface soil for later replacement. The trench is then plowed using a special bulldozer attachment that buries the lines while disturbing less than a meter-wide strip of soil. Once the collection lines are laid in the ditch, the trench is partially backfilled with subsurface soil. Communication lines (discussed below) are then placed in the trench as well. The trench is then backfilled with the remaining subsurface soil, compacted, and then covered with reserved topsoil.

Transformers and Power Poles

Transformers boost the voltage of the electricity produced by the turbines to the voltage of the collection system. Each repowered turbine would have its own transformer adjacent to or within the turbine.

Currently, most medium-voltage lines are aboveground and supported by power poles. Each line requires a right-of-way (typically 50 feet wide) and 26 or 27 wood or direct-embedded steel or self-supporting steel poles per linear mile. All existing poles would be removed as part of repowering. No new poles would be installed where undergrounding of electrical equipment is feasible. The installation of overhead power lines and poles would be limited to locations where underground lines are infeasible and immediately outside the substations where underground medium-voltage lines typically come aboveground to connect to the substation.

To install power poles, a laydown area is required. To mount the medium-voltage lines on a power pole, a pull site and a tension site are required. Pole sites, pull sites, tension sites, access roads, and laydown areas are cleared (i.e., mowed) if necessary. Pole holes and any necessary anchor holes are excavated. Where possible, a machine auger is used to install poles. The width and depth of the setting hole depends on the size of the pole, soil type, span, and wind loading.

Power poles are framed, devices installed, and any anchors and guy wires are installed before the pole is set. Anchors and guy wires installed during construction are left in place. After setting the pole, conductors are strung.

The removal of existing power poles, power lines, and communication lines entails removing the poles directly with an excavator and immediately loading them onto a truck for removal from the site. Wire is cut, coiled, and removed from the site for recycling/scrap value.

Substations

Substations use large transformers to boost the voltage level of the electrical collection system to that of the local power grid (operated by PG&E). Transformers are the principal component of a substation, but substations also require switches, metering devices, lightning protection, and other appurtenant facilities. A large repowering project may require multiple substations, or multiple projects may connect to a single substation where projects can be separately metered. The location of a substation is determined by the location of the power grid interconnection point. Both PG&E and wind company–operated substations are present in the program area; however, repowering activities evaluated in this PEIR are limited to those activities associated with substations owned and operated by the project applicants. Activities associated with PG&E substations are not part of the program evaluated in this PEIR.

To support the program, existing substations would be replaced, upgraded, or expanded. The typical substation would encompass approximately 3 acres, with an additional 3 acres temporarily used during construction. Substation sites are graded, paved, or surfaced (e.g., compacted and graveled), and the area is fenced and lighted for safety and security reasons. Offroad travel is not necessary because substations would be accessed by new or existing roads.

Communication System Installation

Each repowered wind turbine must be connected to the data communication system. The communication system is used to monitor, and in some cases control, the operation of wind turbines (e.g., whether a turbine is on or off or how much power it is producing) and transmits these data through communication lines or wireless technology. Communication systems may be set to trigger an alarm if certain operational conditions arise. The communication system is installed in the same alignment and at the same time as the electricity collection system. Consequently, the installation process is the same as that described for the collection system.

Permanent Meteorological Tower Installation

A system of up to 16 meteorological towers would be installed in strategic locations as part of individual repowering projects to measure wind speed and direction. All permanent meteorological towers would be freestanding towers without guy wires, approximately 80 meters tall.

Equipment Maintenance during Construction

During construction, refueling and maintenance of equipment and vehicles that are authorized for highway travel would be performed offsite at an appropriate facility. Equipment and vehicles that are not highway authorized would be serviced on the project site by a maintenance crew using a specially designed vehicle maintenance truck.

Reclamation Activities

Postconstruction Reclamation

As described in Section 2.4.5, the 2005 CUPs require that wind companies remove all facilities and restore properties to preinstallation conditions once the windfarm is decommissioned. For repowering projects, this requirement entails removing all first- and second-generation wind turbine facility infrastructure that is no longer needed for the repowered project. Site reclamation is typically implemented after the repowered turbines are installed and all temporary equipment and infrastructure is removed from that area.

Reclamation activities involve returning lands disturbed by infrastructure installation or removal to preproject conditions. Some facilities (e.g., roadways, turbine footings, underground collector lines) may be left in place if doing so is deemed to be more protective of natural resources than removal. At each reclamation site, the entire site is contour graded (if necessary and environmentally beneficial), stabilized, and reseeded with an appropriate seed mixture to maintain slope stability. No soil is removed from the site. Figure 2-9 shows reclamation of a turbine pad site. Exceptions to returning a site to preinstallation conditions may be made, with approval of the County Planning Department, if such reclamation activities would or could create water quality issues (e.g., erosion) or if the activities may adversely affect special-status species (e.g., burrowing owl burrow complexes, upland habitat for California red-legged frog or California tiger salamander).

Roads that are not necessary after turbine removal and that are not wanted by landowners would also be reclaimed unless a resource agency (CDFW or USFWS) determines that reclamation would be detrimental to special-status species. In addition, some roads widened for construction may be returned to preproject widths and widened areas reclaimed. Road reclamation may include contour grading to conform to natural surrounding ground levels and backfilling roadcuts on slopes.

Postproject Reclamation

At the end of the 30-year CUP term, it is anticipated that the County’s conditions of approval will require that wind companies remove all turbine-related infrastructure and return the site to preturbine conditions unless an exception is made by the Planning Director. Because it is very difficult to anticipate project site conditions 30 years in advance, project applicants are required to develop a reclamation plan in coordination with the County, USFWS, and CDFW. The reclamation plan must be completed and approved by the County 6 months in advance of project decommissioning or at 29.5 years into the permit, whichever comes first, so that the plan may be implemented immediately upon cessation of turbine operation.

2.5.4 Operations

Turbines would be operated in accordance with manufacturer recommendations and avoidance and minimization measures described in Section 3.4, *Biological Resources*. Manufacturer recommendations for cut-in speed for repowered turbines are expected be 3.5–4 meters per second. The typical cut-out speed is 20–25 meters per second.

Seasonal shutdown of individual turbines may be required as an adaptive management action, but only if impacts on avian species are higher than anticipated in the estimates presented in Section 3.4 of this PEIR. Repowered turbines, once installed, would not be permanently shut down or decommissioned prior to the end of the permit term unless they fail or sustain irreversible damage during operations that necessitate their removal for safety concerns.

2.5.5 Maintenance

Facility Maintenance

Wind companies conduct regular maintenance on turbines to ensure proper operation. These activities are consistent with the maintenance activities for first- and second-generation turbines as described in Section 2.4.3 with one major exception; repowered wind turbines are not removed or relocated as part of ongoing maintenance. Current-generation turbines are much larger and require larger equipment (e.g., cranes and flatbed trucks) to install or remove. Furthermore, because the foundations of current-generation turbines are much larger than those of first- and second-generation turbines, the construction of new foundations requires significant ground disturbance. These factors render moving current-generation turbines to new locations after initial installation technically difficult and financially infeasible.

One other difference in maintenance requirements is that the level of effort to maintain underground collection lines is less than that required for aboveground lines because underground lines are protected from weather and interactions with birds.

In general, maintenance activities would consist of equipment replacement, collection system repair, and road maintenance as necessary. Maintenance-related ground disturbance would take place within the footprint of the initial construction-related disturbance areas. Repair and maintenance of access roads would take place within the footprints of existing access roads. Turbines may need to be repaired or replaced (using the existing tower and foundation) at a rate of approximately one turbine every 5 years. No new permanent effects are anticipated during maintenance activities, and temporarily affected areas, if any, would be restored following disturbance.

Fire Prevention

Windfarms with enclosed tubular towers and no overhead lines or power poles pose reduced fire risk; accordingly, it is anticipated that the County could reduce firebreak requirements in association with repowering efforts. A reduction in the number and extent of firebreaks would reduce ground-disturbing activities around repowered turbines. The California Department of Forestry and Fire Protection (CAL FIRE) would be consulted in the development of any amendments proposed by the County. Specific changes are not proposed as part of the program, but would be developed during implementation and in consultation with CAL FIRE and the County Fire Department as conditions of approval of the CUPs.

2.6 Specific Projects

Permit applications for two specific repowering projects in the program area have been submitted to the County by Golden Hills Wind, LLC (Golden Hills) (a subsidiary of NextEra), which is proposing the Golden Hills Project, and EDF RE (formerly known as enXco), which is proposing the Patterson Pass Project. These are independent wind energy repowering projects that the County has chosen to analyze in a single draft PEIR. However, like the nearby Sand Hill repowering project (which is being analyzed in a separate CEQA process), they may be approved separately from each other and from the program. Their approval is not dependent on the approval of any other repowering project, and the approval of either will not cause the repowering of any other project. The environmental impacts of these projects are evaluated in this PEIR at the project level. It is anticipated that the project-specific mitigation measures contained in this PEIR will be included as enforceable conditions of approval of any CUPs approved for these projects.

Each of the proposed projects is described below. In general, proposed development activities would be the same as those described above under *Proposed Repowering*; these activities are not repeated here. However, additional discussion is provided where necessary to address specific design, siting, or potential impact mechanisms that are not described above. Where project-level design has not been completed, project-related metrics (e.g., areas of disturbance associated with specific types of activities) are based on the recently completed Vasco Winds project in the northern (Contra Costa County) portion of the APWRA.

2.6.1 Golden Hills Wind Energy Facility Repowering Project

Golden Hills proposes to repower an existing wind energy facility in the program area to replace outdated and inefficient wind turbines with fewer and more efficient turbines. The proposed Golden Hills Project would decommission and remove existing wind turbines on the existing wind energy facility site, install new and fewer turbines, and make improvements to related infrastructure. The proposed project would comprise up to 52 new 1.7 MW GE turbines. The proposed project area, existing and proposed turbine layout are shown in Figure 2-10.

Project Location and Land Ownership

The Golden Hills project area encompasses approximately 4,528 acres on 38 parcels. Site access is from local roads through existing gates. The proposed project would improve access at gates inside and around the site. The parcels making up the project area are listed in Table 2-3.

Table 2-3. Golden Hills Project Parcels

Assessor's Parcel Number	Acreage
99A-1760-1-3	112.9
99A-1770-2-1	119.7
99A-1770-2-2	38.8

Assessor's Parcel Number	Acreage
99A-1770-2-3	47.6
99A-1770-3	157.4
99A-1770-4	159.1
99A-1770-999-99	3.8
99A-1780-1-4	549.8
99A-1785-1-14	199.4
99A-1790-1	156.8
99A-1790-2	153.1
99A-1790-3	319.9
99A-1795-1	634.7
99A-1810-1	252.0
99B-5650-1-4[a]	64.7
99B-5650-2-1	70.5
99B-5650-2-3[a]	0.1
99B-5650-2-4[a]	70.0
99B-6400-1-10	51.0
99B-6400-1-8	0.4
99B-6400-1-9	0.7
99B-6400-2-2	3.4
99B-6400-2-3	0.2
99B-6400-2-6	296.0
99B-6400-4[a]	33.0
99B-6425-2-3	252.3
99B-7800-2	10.7
99B-7800-9	38.1
99B-7890-1-3[a]	133.8
99B-7890-2-4[a]	107.5
99B-7890-5[a]	8.9
99B-7900-1-3	15.8
99B-7900-1-4	0.1
99B-7900-1-5[a]	253.8
99B-7900-1-6	6.1
99B-7900-1-7[a]	148.0
99B-7900-2[a]	9.9

[a] Acreage shown is portion of parcel within project area; remainder of parcel is outside project area boundary

Existing operations are subject to the terms and conditions of the existing lease agreements with the underlying landowners. If the County approves the proposed project (by approving the CUP), the existing easements between Golden Hills and each landowner would be revised and formalized to identify the final location of proposed project components. The creation and modification of these landowner agreements to accommodate the proposed project are not subject to CEQA requirements.

Project Need, Goals, and Objectives

As recognized by the County, the proposed project would serve the public and market need for electrical energy, the documented and public policy need to produce renewable energy, and the widely held public and regulatory agency need to substantially reduce avian mortality related to wind turbine operations. The goals of the applicant reflect those of the program: to repower its windfarm assets in compliance with the existing CUPs and applicable laws, reduce avian mortality, and meet County general plan and state goals for production of renewable energy.

The applicant's objectives for the proposed project include implementation of provisions of the 2010 *Agreement to Repower Turbines at the Altamont Pass Wind Resource Area*. Consistent with that agreement, Golden Hills intends to replace approximately 2,400 turbines between 2010 and 2014, and will shut down all its existing turbines by November 2015. Golden Hills' objective over 4 years is to replace its estimated 160 MW of generating capacity in two phases, beginning with the 88.4 MW Golden Hills Phase 1 Project, which is the project addressed in this PEIR. Golden Hills Phase 2 will be evaluated in a separate CEQA document. The 2010 Agreement was in part intended to satisfy NextEra's obligations under the 2007 Settlement Agreement.

The 2010 Agreement, among other items, specified a mitigation fee for ongoing harm to focal raptor species. Under this clause, NextEra agreed to pay a mitigation fee of $10,500 per MW of installed capacity for each repowering phase. These funds would go to support CEC's Public Integrated Energy Research Program for scientific research on the effects of wind turbines on birds and bats in the APWRA, as well as to support other entities (e.g., the East Bay Regional Park District, the Livermore Area Regional Park District) engaged in conservation efforts for bird and bat species in the APWRA and vicinity. Because this agreement is in place, that contribution is considered part of the project, and is accounted for in the discussion of impacts on biological resources in Section 3.4.

Existing Facilities

Golden Hills would remove up to 775 wind turbines on the existing windfarm site, including the associated transformers, electrical equipment, and meteorological towers. Decommissioning and removal of the existing turbines and ancillary facilities would allow the existing wind energy facility to be repowered.

The existing wind turbines, of various models, are characterized by hub heights of 18–43 meters (60–140) feet and rotor diameters of 18–33 meters (59–108 feet). The existing turbine foundations are concrete piers or pads with approximately 10 feet of drain rock placed around each foundation. The existing underground collection system would remain in place and would not be excavated.

Existing roads and other disturbed areas not needed for the proposed project's new turbines would be decommissioned, contour graded (if necessary and if environmentally beneficial), stabilized, and reseeded with an appropriate seed mixture to maintain slope stability.- Temporary erosion control measures would be implemented to maintain topsoil and revegetation.

Proposed Project

Golden Hills would install up to 52 new 1.7 MW turbines and related infrastructure with an aggregate nominal nameplate capacity of 88.4 MW. The specific equipment chosen for the proposed project would depend on final micrositing.

Siting would be determined prior to construction and on the basis of various siting criteria, such as terrain, geotechnical considerations, and the opportunity to avoid or minimize potential impacts, including impacts on avian species. Golden Hills would develop a siting strategy to avoid and minimize bird and bat mortality, using predictive models to site turbines in areas with the least potential for avian impacts to occur. These models, developed by Smallwood and Neher (2010), incorporate utilization data; digital elevation modeling; slope attributes; techniques to identify saddles, notches, and benches; and associations between bird utilization and slope attributes. The models essentially result in the identification of areas with predicted high activity where wind turbines should not be placed.

Construction of the wind turbines would incorporate best management practices (BMPs) that are standard practice and normally required by building permits for large projects (e.g., dust suppression, erosion control measures, traffic management, noise controls, covering or enclosure of dry materials, controlled handling of hazardous materials). Many of these practices would be mandated as mitigation measures identified in this PEIR; moreover, because project proponents fully anticipate implementation of such practices, many may be incorporated directly into the individual project proposals.

Wind Turbines

Golden Hills would likely select a turbine with characteristics similar to those of the GE 1.7 XLe model: a 1.7 MW turbine with a hub height of 80–96 meters (262–315 feet), a rotor diameter of 100–115 meters (328–377 feet), a total height up to 153 meters (502 feet), and a minimum distance from ground to rotor tip at 6:00 position of 30 meters (98 feet).

Foundations

Once the roads have been constructed or upgraded, turbine foundations would be constructed. A geotechnical report would be prepared to identify the appropriate turbine foundation design. Pending completion of the geotechnical analysis, each foundation is expected to require an excavation of up to 18 meters (60 feet) in diameter, with foundations constructed of steel-reinforced concrete. Concrete for the foundations would be provided from the temporary batch plant and transported using concrete trucks. A rectangular gravel crane pad area approximately 20 by 40 meters (65 by 130 feet) would be developed at the base of each tower.

Roadway Improvements

Turbine transport involves equipment and crane specifications that dictate road width and turning radii. To allow safe passage of the large transport equipment used in construction, all-weather gravel roads would be built with adequate drainage and compaction to accommodate such vehicles. The proposed road construction described below is designed to minimize disturbance, avoid sensitive resources, and maximize transportation efficiency.

After sensitive areas have been identified and marked, initial grading of access roads and interior project roads would commence. The proposed permanent gravel roads would be constructed to County standards. Cut materials will be used as fill onsite; no material would be disposed of offsite. General cut-and-fill slopes would be established at a 2:1 ratio. The final location of the road and the cut-and-fill volumes would be based on grading, construction, and environmental permitting requirements; topography; and sound engineering principles. The construction-related assumptions for roads are described below.

Interior Project Roads

The project would involve construction of about 104,000 linear feet of roadways. Interior project roads would have temporary construction widths up to 52 feet: a maximum 40-foot width plus two 6-foot shoulders. Following project construction, the permanent access roads would be finalized (see below); temporarily disturbed shoulders and passing areas would be reclaimed. To the greatest extent possible, the new roadway system would be designed to limit disturbance and avoid sensitive resources. The proposed project's interior road system would follow existing roadway alignments where possible, but grade adjustments as required by the turbine manufacturers would be made in many locations to accommodate maximum grades. The maximum road grade on access roads used during construction would be approximately 10%.

Temporary passing areas would be provided along one-way roadways approximately every 2,500 feet to facilitate safe passing of traffic through the site interior. Up to 50% of the turnout areas developed during construction would be maintained to support safe passing for subsequent O&M traffic on the interior road system. The remaining turnouts and turnaround areas would be reclaimed and temporary shoulder areas could be restored. Temporarily disturbed areas would be restored in accordance with the proposed project's reclamation plan and with all relevant permit conditions.

Drainage culverts (new or upgrade of existing) would be installed (or removed) in accordance with County standards. Primarily, these culverts would be installed to divert water away from areas where drainage swales intersect with roadways, thus preventing high stormwater flows from crossing road surfaces.

Postconstruction Project Road Conditions

Following road construction, all roads will be inspected to determine if and where any additional grading or additional gravel will be necessary to meet County standards. Additionally, final road shaping will be completed to ensure proper water flow away from cut-and-fill slopes and into ditches and culverts. Erosion control devices also will be installed or completed, disturbed areas adjoining the roads will be restored, and the appropriate erosion control devices will be installed.

Following construction, depending on whether they will be needed to provide access for O&M, roads will be left in place or restored in conformance with County standards. Roads left in place will be inspected and graded where low spots and ruts have formed. Culverts will be left in place and road edges will be restored.

Improvements at Local Access Roads

Proposed project ingress/egress to the site would be via North Flynn Road, Patterson Pass Road, and Midway Road.

To the extent possible, existing roads would be used for proposed project construction and operations. The existing roadway system primarily consists of gravel access roads up to 16 feet wide. All-weather gravel roads would be built with adequate drainage and compaction to accommodate equipment transport vehicles. Improvements could require the widening of roadways outlined above to provide additional shoulder and lane widths. Minor drainage improvements could be required to adjust existing drainage inlets to grade and provide roadside ditches.

All road improvements would be designed according to Alameda County design standards. Preliminary design for the project ingress and egress points would be provided to the Alameda County Public Works Department. Encroachment permits, for minor roadway improvements if needed, would be needed from the Alameda County Public Works Department and would be designed to meet Alameda County Design Standards (and Caltrans Highway Design Manual Standards, as applicable). An encroachment permit for improvements within the public right-of-way falling within Alameda County would be needed, and the Alameda County Public Works Department would conduct design review of the proposed improvements.

After construction, the permanent access roads would be reduced in width to 25 feet and the remaining disturbed area would be reclaimed. Temporarily disturbed areas would be reclaimed as determined through consultations with USFW, CDFW, and the County. Erosion control devices would be installed or completed. Drainage culverts would be installed or removed as appropriate in accordance with Alameda County standards to prevent high stormwater flows from crossing road surfaces.

Golden Hills would repair, repave, or reconstruct those portions of existing County roads damaged during construction in accordance with applicable design standards agreed upon prior to beginning construction.

Power Collection System

Collection Lines

The power collection system would consist of medium-voltage, high-density, insulated underground cables that would connect the turbines to the onsite substation. The underground collection cables are generally buried in trenches adjacent to the roadbed of the interior access roads. Communication lines would be installed in the same trenches. No existing collection lines would be used.

Trenching equipment would be used to excavate trenches in or near the access roadbed to allow installation of the insulated underground cables that would connect each turbine to the substation. The trenches typically would be 12–24 inches wide and 48 inches deep, but their depth and number would be determined ultimately by the size of the cable required and the thermal conductivity of the soil or rock surrounding the trench. The large conductor cables would be placed within the trenches, packed in sand or native materials depending on the soil properties, and covered to protect the cables from damage or possible contact. Optical fiber communication links and communication lines for turbine performance remote-sensing equipment would be placed in the same trenches as the conductor cables. In locations where two or more sets of underground lines converged, pad-mounted switch panels would be used to tie the lines together into one or more sets of larger feeder conductors. The accumulated cables from the individual arrays would be spaced 10 feet apart on either side of the road system in “home runs” to the onsite substation. The locations of the buried infrastructure would be recorded in as-built project diagrams that would be developed at the end of the construction period. Because a significant portion of the underground collection cables would be installed parallel to and within the footprint of areas temporarily disturbed by road construction, installation of the collection system is only expected to result in minimal additional permanent surface disturbance.

Because underground collection cables would be installed parallel to and within the footprint of areas temporarily disturbed by road construction, installation of the collection system is not expected to result in permanent surface disturbance. Installation would result in an estimated 14.3 acres of temporary disturbance.

Collector Substation

The main functions of a collector substation are to step up the voltage from the collection lines (34.5 kV) to the transmission level (115 kV) and to provide fault protection. The basic elements of the substation facilities are a control house, a bank of one or two main transformers, outdoor breakers, capacitor banks, relaying equipment, high-voltage bus work, steel support structures, an underground grounding grid, and overhead lightning-suppression conductors. The main outdoor electrical equipment and control house are installed on a concrete foundation.

The existing onsite substation (Midway) serves as the collector substation for the existing windfarm. This substation would be replaced by another in the same general location. The substation would consist of a graveled footprint area of approximately 2 acres, a 12-foot chain-link perimeter fence, and an outdoor lighting system. The new lights would be shielded or directed downward to reduce glare. For the purposes of this analysis it is assumed that these lights would remain on from dusk to dawn. Construction of the substation would entail a total disturbance area of up to 6 acres. Of these 6 acres, 3 acres would be disturbed temporarily during construction and would be restored after construction is complete. The remaining 3 acres would be permanently disturbed.

An energy storage unit encompassing approximately 1 acre would be constructed within the 3-acre permanent disturbance footprint of the collector substation facility. The modular design would accommodate lithium-ion batteries, either in a building or in approximately thirty 40-foot International Standard Organization (ISO) containers. The facility would contain all necessary energy management hardware and software to manage energy supply from the turbines to the power grid, as well as a fire detection and suppression system and air conditioning. Construction is anticipated to require approximately 4 months. Battery replacement would be required over the life of the project, and waste batteries would be removed from the site and transported either to the manufacturer or to an approved battery reprocessor for recycling or disposal.

Meteorological Towers

The proposed project would entail construction of four permanent meteorological towers distributed through the project area to monitor weather conditions and wind speed. Each freestanding tower would be mounted on a circular pier or slab foundation surrounded by a circular area of gravel to a radius of about 15 feet.

Operations and Maintenance Facilities and Other Project Elements

Operations and maintenance facilities would involve a permanent disturbance of 2 acres. The precise location of these facilities has not yet been identified.

Up to four portable toilets would be maintained year-round onsite and serviced by a contractor. No other water, wastewater, or sewer/septic systems are present at the existing windfarm, and no changes to the water, wastewater, or sewer/septic system are proposed to support the proposed project.

Project Construction

Turbines would likely be delivered to the site from the Port of Stockton or other nearby port or rail transfer location. Tower assembly requires the use of one large track-mounted crane and two small cranes. The turbine towers, nacelles, and rotor blades would be delivered to each foundation site and unloaded by crane. A large track-mounted crane would be used to hoist the base tower section vertically then lower it over the threaded foundation bolts. The large crane would then raise each additional tower section to be bolted through the attached flanges to the tower section below. The crane then would raise the nacelle, rotor hub, and blades to be installed atop the tower. Two smaller wheeled cranes would be used to offload turbine components from trucks and to assist in the precise alignment of the tower sections.

Schedule

Proposed project construction would proceed after all construction-related permits are issued. These activities are anticipated to proceed according to the phases outlined in Section 2.5.3, *Repowering Activities*. Construction-related best management practices (BMPs) would be implemented during the November–April wet season. The final approved work hours would be specified in the proposed project's CUP. If extended hours are necessary or desired, the appropriate approvals would be sought.

Workforce

Based on data provided for typical wind energy projects of similar size, approximately 50 workers would be employed to decommission the existing wind farm. On average, approximately 200 workers would be employed during construction, with a peak workforce of 300. Craft workers would include millwrights, iron workers, electricians, equipment operators, carpenters, laborers, and truck drivers. Local construction contractors and suppliers would be used to the extent possible.

Construction Equipment and Ancillary Construction Facilities

The types of equipment listed in Section 2.5.3, *Repowering Activities*, would be used during the various stages of decommissioning and construction. On average, all equipment is assumed to operate for approximately 10 hours per day. The probable fuel type is diesel.

Temporary Concrete Batch Plant

Depending on weather conditions, concrete typically needs to be poured within 90 minutes of mixing with water. Delivery time to onsite pour locations would likely exceed 90 minutes from existing concrete suppliers in the proposed project vicinity. Accordingly, Golden Hills proposes to construct an onsite temporary concrete batch plant to facilitate concrete delivery for the turbine foundations.

The temporary batch plant would operate only during construction. The batch plant would require a stand-alone generator of approximately 250 kW. Fuel for the generator would be obtained from an aboveground storage tank (AST) with secondary containment for spill prevention. It is estimated that the batch plant would consume up to 5,400 gallons of water per day. A temporary 5,000-gallon water tank would be placed onsite to replenish the batch plant water, as needed.

Stockpiles of sand and aggregate would be situated near the batch plant in a manner that would minimize exposure to wind. Concrete would be discharged using a screw conveyor directly into an elevated storage silo. The construction managers and crew would use BMPs and standard operating procedures to keep the plant, storage, and stockpile areas clean and to minimize the buildup of fine materials.

Portable Rock Crusher

To construct and improve proposed project roads, a rock crusher would be required to provide appropriately sized aggregate for fill and road base. The portable rock crusher would be co-located with the batch plant. In accordance with BMPs, the rock-crushing area would be sprayed by a water truck to suppress dust. The crusher proposed for this project incorporates several dust-suppression features, including screens and water spray. Dust-control measures would be used at all emission points during operation, including startup and shutdown periods, as required.

Equipment Maintenance

During construction, refueling and maintenance of equipment and vehicles that are authorized for highway travel would be performed offsite at an appropriate facility. Equipment and vehicles that are not highway authorized would be serviced on site by a maintenance crew using a specially designed vehicle maintenance truck.

Staging and Laydown Areas

The proposed project includes construction staging areas (for storage of project components and equipment) and additional laydown areas at each turbine location (for offloading and storage of the tower components).

Construction Staging Areas

Temporary staging areas would be used during construction. It is anticipated that up to six staging areas, ranging from 1.7 to 7.0 acres (average 3.4 acres), would be used for the storage of turbine components, construction equipment, office trailers, and other supplies including hazardous materials. The batch plant, rock crusher, and associated fuel and water tanks would be co-located within the disturbed area footprint of one of the staging areas. Trailers would be placed at the staging areas to support workforce needs and site security. The trailers would also house a first aid station, emergency shelter, and hand tool storage area for the construction workforce. Vegetation would be cleared and each construction staging area would be graded to be level. It then would be covered with a 4-inch gravel surface and appropriate erosion control device (e.g., earth berm, silt fences, straw bales) would be installed to manage water runoff. Diversion ditches would be installed, as necessary, to prevent stormwater from running onto the site from surrounding areas. Following completion of construction activities, the contractor would restore the temporary construction staging areas. The gravel surface would be removed and the areas would be contour graded (if necessary and if environmentally beneficial) to conform with the natural topography, stockpiled topsoil would be replaced, and the area would be stabilized and reseeded with an appropriate seed mixture.

Laydown Areas

A laydown area would be constructed at each new turbine pad to accommodate offloading and storage of the tower sections, nacelle, rotor hub, and blades, as well as some construction equipment. Each laydown area would occupy approximately 0.5 acre. The laydown areas would include a compacted, gravel-surfaced crane pad within the 0.5-acre area. The crane pad would be approximately 65 feet wide (adjacent to the turbine access road) to allow a large track-mounted crane to access the turbine foundations. The laydown areas must be level or nearly level to allow the crane to lift the large and extremely heavy turbine components safely, and vegetation clearing and/or grading would be necessary. The crane pad would be constructed using standard cut-and-fill road construction procedures. The laydown areas would generally be circular. The actual dimensions of the individual laydown areas would be based on site topography and the need to minimize cut and fill.

Hazardous Materials Storage

Hazardous materials would be stored at one of the staging areas (use of extremely hazardous materials is not anticipated). To minimize the potential for harmful releases of hazardous materials through spills or contaminated runoff, these substances would be stored within secondary containment areas in accordance with federal, state, and local requirements and permit conditions. Storage facilities for petroleum products would be constructed, operated, and maintained in accordance with the Spill Prevention Control and Countermeasures (SPCC) Plan that would be prepared and implemented for the proposed project (Code of Federal Regulations [CFR], Title 40, Part 112). The SPCC Plan would specify engineering standards (for example, secondary containment); administrative standards (for example, training with special emphasis on spill prevention, standard operating procedures, inspections); and BMPs.

A Hazardous Materials Business Plan (HMBP) would be developed for the proposed project. The HMBP would contain specific information regarding the types and quantities of hazardous materials, as well as their production, use, storage, spill response, transport, and disposal.

Traffic and Parking

Golden Hills would prepare a Traffic Management Plan for the proposed project to reduce hazards that would result from the increased truck traffic, and to ensure that traffic flow on local public roads and highways would not be adversely affected. This plan would incorporate measures such as informational signs, traffic cones, and flashing lights to identify any necessary changes in temporary land configuration. Flaggers with two-way radios would be used to control construction traffic and reduce the potential for accidents along roads. Speed limits would be set commensurate with road type, traffic volume, vehicle type, and site-specific conditions as necessary to ensure safe and efficient traffic flow. Onsite construction traffic would be restricted to the roads developed for the proposed project. Use of existing unimproved roads would be restricted to emergency situations.

Preconstruction decommissioning activities and delivery of construction materials and equipment would require approximately 16,513 fully loaded inbound trips of large trucks to the site from offsite sources, for a total of up to 33,026 inbound and (empty) outbound truck trips associated with the proposed project. It is estimated that up to 900 of these trips would include oversized vehicles delivering wind turbine generator and substation materials, heavy equipment, and other construction-related materials. Construction of the proposed project components (roads, turbines, substation, and electrical/communication lines) would occur at about the same time, using individual vehicles for multiple tasks. Based on data provided for typical similarly sized wind energy projects, it is anticipated that during the construction period, there would be approximately 60 daily round trips by vehicles transporting construction personnel to the site. Assuming that construction material deliveries from external sources would occur over the 8-month construction period at 20 workdays per month, an average of about 81 one-way truck trips per day (that is, 40.5 trucks generating one trip to the proposed project site and one trip from the site) would be added to background traffic volumes on area roadways. In addition to these large truck loads, dump trucks, concrete trucks, water trucks, cranes, and other construction and trade vehicles operating within the project area would entail more than 12,000 truck trips.

Construction-related parking would be located in construction staging areas. Carpooling from a location within 10 miles of the site, other than the O&M facility, would also be used.

After construction, O&M of the proposed project would require approximately eight round trips per day using pickups or other light-duty trucks.

Water and Wastewater Needs

Water for project construction activities would be provided through an agreement with municipal or private suppliers. Temporary onsite water tanks and water trucks would be made available for fire water support, dust suppression, and construction needs. One or more 3,500-gallon tanks or other means of fire water support would be subject to approval by Alameda County.

During construction, up to 50 million gallons of water would be used for dust control on roads and during grading and site work, as well as for mixing with cement and aggregate to form concrete. Daily water use would vary, depending on the weather conditions and time of year, which affect the need for dust control. Hot, dry, windy conditions would necessitate greater amounts of water. Tanker trucks would apply water to construction areas where needed to aid in road compaction and reduce construction-generated dust.

For construction of foundations, water would be transported to the batch plant site where it would be used to mix concrete. A minimal amount of water would be required for construction worker needs (drinking water, sanitation facilities). This water would be trucked in or delivered as bottled drinking water. A local sanitation company would provide and maintain appropriate construction sanitation facilities. Portable toilets would be placed at each of the crane assembly areas, the concrete batch plant, the substation, and the trailer pad area. When necessary, additional facilities would be placed at specific construction locations.

Appropriate BMP training would be provided to truck operators to prevent runoff from dust suppression and control activities. Water used for cement mixing and truck washing would be managed in accordance with applicable permit conditions (and BMPs) and would not be discharged offsite.

Demarcation of Sensitive Resources

Sensitive resources adjacent to and within construction areas would be marked to ensure adequate avoidance. Sensitive areas identified through the environmental approval and permitting processes would be staked and flagged. Prior to construction, an environmental inspector (if required), the construction contractor, and any subcontractors would conduct a walk-through of areas to be affected, or potentially affected, by construction activities. The preconstruction walk-throughs would be conducted regularly to identify sensitive resources to be avoided, limits of clearing, location of drainage features, and the layout for sedimentation and erosion control measures. Following identification of these features, specific construction measures would be reviewed, and any modifications to construction methods or locations would be agreed upon before construction could begin. Resource agency representatives would be consulted or included on these walk-throughs as needed.

Materials and Services

Approximately 200,000 cubic yards of aggregate would be brought onto the proposed project site for roadway construction, turbine foundations, and the onsite substations.

Inspection and Startup Testing

Prior to operation, each completed turbine would be inspected and checked for mechanical, electrical, and control functions in accordance with the manufacturer's specifications before being released for startup testing. A series of startup procedures would then be performed by the manufacturer's technicians. Electrical tests on the transformers, underground power lines, and collector substation would be performed by qualified engineers, electricians, and test personnel to ensure that electrical equipment is operating within tolerances and that the equipment had been installed in accordance with design specifications. The aboveground power lines interconnecting to the PG&E system would be tested and inspected as required.

Cleanup and Restoration

Clearing and disposing of trash, debris, and scrub on those portions of the site where construction would occur would be performed at the end of each workday through all stages of construction. Existing vegetation would be cleared only where necessary. All excavations made by clearing would be backfilled with compacted earth and aggregate as soon as cable infrastructure is tested. Disposal of cuttings and debris would be in an approved facility designed to handle the waste.

Before construction is complete, all remaining trash and debris would be removed from the site. All temporarily disturbed areas would be returned to their previous contours and any debris would be removed and properly disposed of offsite consistent with Alameda County restoration requirements and described in a Reclamation Plan, which would be developed prior to construction as part of the construction planning and permitting process. Any material placed in the areas of the foundations or roads would be compacted as required for soil stability.

Operation and Maintenance

O&M activities for the proposed project would be similar to the O&M activities presently conducted for the existing wind facility.

Safety and Environmental Compliance Programs

Quality Assurance and Quality Control

A quality assurance/quality control (QA/QC) program would be implemented to ensure that construction and startup of the facility are completed as specified. Golden Hills would be responsible for ensuring implementation of the QA/QC program prior to construction. The program would specify implementing and maintaining QA/QC procedures, environmental compliance programs and procedures, and health and safety compliance programs and procedures, and would integrate Golden Hill's activities with the contractors during project construction. The engineering procurement and construction (EPC) contractor and turbine supplier would be responsible for enforcing compliance with the construction procedures program of all of its subcontractors.

Environmental Compliance

Orientation of construction staff would include education on the potential environmental impacts of project construction. The construction manager would establish procedures for staff to formally report any issues associated with the environmental impacts, to keep management informed, and to facilitate rapid response.

Stormwater Control

Because the proposed project would disturb more than 1 acre, it would require coverage under the state's General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order 2010-0014-DWQ) (Construction General Permit). Permit coverage would be obtained by submitting permit registration documents (PRDs) to the State Water Resources Control Board through its Stormwater Multiple Application and Report Tracking System (SMARTS) website. The PRDs include a notice of intent, site maps, a stormwater pollution prevention plan (SWPPP), a risk level assessment, and other materials. The SWPPP would include the elements described in Section A of the Construction General Permit and maps that show the location and type of erosion control, sediment control, and non-stormwater BMPs, which are intended to prevent significant water quality impacts on receiving waters. Depending on the risk level, the SWPPP may also specify that sampling of pH and turbidity in the runoff leaving the site be conducted during construction. The SWPPP would also describe site inspection, monitoring, and BMP maintenance procedures and schedules.

Safety Compliance

Golden Hills and its construction contractors and subcontractors would be responsible for construction health and safety issues. Each contractor and subcontractor would provide a health and safety (H&S) coordinator, who would ensure that applicable laws, regulations, ordinances, and standards concerning health and safety are followed and that any identified deficiencies are corrected as quickly as possible. The H&S coordinator would conduct onsite orientation and safety training for contract and subcontract employees and would report back to the onsite construction manager. Upon identification of a health and safety issue, the H&S coordinator would work with the construction manager and responsible subcontractor or direct hire workers to correct the violation.

Emergency Situations

If severe storms result in a downed interconnection power line, standard O&M procedures would be applied. The turbines would be equipped with internal protective control mechanisms to safely shut them down in the event of a high-voltage grid outage or a turbine failure related to fire or mechanical problems. A separate low-voltage distribution service feed might be connected to the low-voltage side of the collector substation as a backup system to provide auxiliary power to project facilities in case of outages. For safety, the collector substation would be fenced, locked, and properly signed to prevent access to high-voltage equipment. Safety signage would be posted around turbines, transformers, other high-voltage facilities, and along roads, as required.

Public Access and Security

The proposed project would be located entirely on private property and public property with restricted public access. Only authorized access to the project site would be allowed. The site is fenced and the collector substations would be fenced with an additional 12-foot-high, chain-link fence to prevent public and wildlife access to high-voltage equipment. Safety signs would be posted in conformance with applicable state and federal regulations around all turbines, transformers, and other high-voltage facilities and along access roads. Vegetation clearance would be maintained adjacent to project ingress and egress points and around the collector substations, transformers, and interconnection riser poles.

Hazardous Materials Storage and Handling

The County's Hazardous Materials Program Division is the Certified Unified Program Agency (CUPA) for all areas of Alameda County. Management of hazardous materials would be conducted in accordance with a County-approved HMBP developed for the proposed project pursuant to the requirements of the CUPA. Hazardous materials used during O&M activities would be stored within the existing O&M building in aboveground containers with appropriate spill containment features as prescribed by the local fire code or the SPCC Plan for the O&M building as stipulated by the appropriate regulatory authority. Such materials would be similar in type and amount to those currently stored and used for O&M for the existing facility.

Lubricants used in the turbine gearbox are potentially hazardous. The gearbox would be sealed to prevent lubricant leakage. The gearbox lubricant would be sampled periodically and tested to confirm that it retains adequate lubricating properties. When the lubricants have degraded to the point where they are no longer adequate, the gearbox would be drained, new lubricant would be added, and the used lubricants would be disposed of at an appropriate facility in accordance with all applicable laws and regulations.

Transformers contain oil for heat dissipation. The transformers are sealed and contain no polychlorinated biphenyls (PCBs) or moving parts. The transformer oil would not be subject to periodic inspection and does not need replacement.

O&M vehicles would be properly maintained to minimize leaks of motor oil, hydraulic fluid, and fuel. During operation, O&M vehicles would be serviced and fueled at the existing O&M building (using mobile fuel tanks) or at an offsite location. No storage tanks are located at the existing windfarm, and none are proposed.

Operation and Maintenance Activities

Maintenance of turbines and associated infrastructure includes a wide variety of activities. Routine maintenance involves activities such as checking torque on tower bolts and anchors; checking for cracks and other signs of stress on the turbine mainframe itself and other turbine components; inspecting for leakage of lubricants, hydraulic fluids, and other hazardous materials and replacing them as necessary; inspecting the grounding cables, wire ropes and clips, and surge arrestors; cleaning; and repainting. Most routine maintenance activities occur within and around the tower and the nacelle. Cleanup from routine maintenance activities would be performed at the time maintenance is performed by the O&M personnel. While performing most routine maintenance activities, O&M staff would travel by pickup or other light-duty trucks. In addition, on routine maintenance such as repair or replacement of rotors or other major components could be necessary.

Such maintenance would involve use of one or more cranes and equipment transport vehicles, though the cranes would not be as large as the track-mounted cranes used to erect the turbine towers.

Monitoring of the proposed project's operations would be computer-based; computers in the base of each turbine tower would be connected to the existing O&M facility through fiber-optic telecommunication links.

The O&M workforce is not anticipated to change from the existing turbine technicians, operations personnel, administrative personnel, and management staff. O&M staff would continue to monitor turbine and system operation, perform routine maintenance, shut down and restart turbines when necessary, and provide security. All O&M staff would be trained regularly to observe BMPs.

Ultimate Decommissioning and Reclamation

The anticipated life of the windfarm is more than 30 years, as upgrading and replacing equipment could extend the operating life indefinitely with appropriate permit approvals. However, the life of the proposed project for CEQA purposes would be coterminous with the term of the CUP required for its operation

The ultimate decommissioning and removal of the proposed project would be similar to the decommissioning and removal of existing windfarm components that would be undertaken prior to construction of repowered facilities, except that considerably fewer turbines would be removed. In addition, existing service roads would be used. No new access roads would be required, and no roads extant at that time are expected to require widening.

Decommissioning would involve removing the turbines, transformers, substations, foundations and related infrastructure to a depth of 3 feet below grade. A single large crane would be used to disassemble the turbines, and smaller cranes would lift the parts onto trucks to be hauled away. Generally, turbines, electrical components, and towers would either be refurbished and resold or recycled for scrap. All unsalvageable materials would be disposed of at authorized sites in accordance with federal, state, and local laws, regulations, ordinances, and adopted County policies in effect at the time of final decommissioning. Following removal of the equipment and structures, a dozer would be used to spread dirt over the foundations. Road reclamation would be accomplished using scrapers and gravel trucks. Site reclamation after decommissioning would be subject to a County-approved reclamation plan (County Code Article 88-3.8). Based on site-specific requirements, the reclamation plan would include regrading, spot replacement of topsoil, and revegetation of disturbed areas with an approved seed mix.

2.6.2 Patterson Pass Project

Project Location and Land Ownership

The Patterson Pass Wind Farm Repowering Project (Patterson Pass Project) would entail repowering of the existing 21.8 MW windfarm, permitted under CUP C-8263, ENXCO, Inc./ Patterson Pass Farms, owned by Patterson Pass Wind Farm, LLC (Patterson Pass). The existing windfarm originally comprised 336 Nordank and Bonus 65 kW turbines, of which 317 turbines remain operational. The Patterson Pass Project is depicted in Figure 2-11.

Access to the Patterson Pass Project would be through existing private gates, likely from Patterson Pass Road, Jess Ranch Road, or both.

Project Need, Goals, and Objectives

The project objective is to repower the existing Patterson Pass Wind Farm on private land owned by EDF RE and develop a 19.8 MW commercially viable wind energy facility that would deliver renewable energy to the PG&E/CAISO power grid to meet the state's RPS goals. Patterson Pass Wind, LLC and its parent company EDF RE were party to the 2007 Settlement Agreement described above; the proposed repowering would fulfill EDF RE's obligations under that agreement.

The proposed project elements are listed below.

- A total nameplate generation capacity of up to 19.8 MW.
- Removal of existing wind turbines and installation of 8–12 new wind turbine generators, towers, foundations, and pad-mounted transformers to meet milestones set forth in the project's power purchase agreement.
- Development of project roads and installation of a power collection system as necessary.
- Use of existing electrical power transmission lines to convey the wind energy produced by the project to local and regional energy markets.
- Use of existing roads that provide access throughout much of the program area.
- Use of existing substation and switchyard (with potential upgrades of the existing equipment within the footprint of the existing facility).
- Use of the existing O&M facility and other support facilities adjacent to the project area that are available for project utilization and that will continue to receive power from the substation during the repowering process.

Existing Facilities

The Patterson Pass Wind Farm, commissioned in 1984, has been operational for 27 years. It comprises three parcels, totaling approximately 952 acres, wholly owned by Patterson Pass, a subsidiary of EDF RE (Table 2-4). The location of the project and the distribution of the existing first-generation turbines are shown in Figure 2-11.

Table 2-4. Patterson Pass Project Parcels

Assessor's Parcel Number	Approximate Acres
099A-1800-001-00	617.8
099A-1800-002-01	148.7
099B-7985-001-02	185.4

Operation and Maintenance

The existing Patterson Pass O&M building, encompassing approximately 4,600 square feet, houses maintenance equipment, spare parts inventories, collection/communication systems equipment, and the windfarm control center.

The windfarm is staffed 5 days a week, 8 hours a day, with weekend monitoring. Most existing wind turbines are fitted with control systems at the turbine towers; these systems are in communication with a remote, centralized control center, connected to the Opto-22 SCADA system to collect data. Additionally, each turbine functions as a standalone unit.

The wind turbine control and monitoring systems utilize communication lines that generally run parallel with the collection system lines and connect back to the Patterson Pass O&M building through the Opto-22 SCADA system.

Turbine Foundations

The existing turbine foundations are concrete, single spread or pier foundations supporting tubular towers. Each foundation has a footprint of approximately 20 by 20 feet.

Access Roads

Access to the project area is through locked gates from County and private roads (Patterson Pass Road and Jess Ranch Road, respectively). In the project area, main access roads connect turbine strings, and spur roads branch from the main access roads to individual turbines and other facilities.

Collection System

Electricity is collected from each wind turbine and transmitted to the ADCC substation, where its voltage is increased for interconnection with PG&E's transmission lines, which traverse the project area. The collection system includes pad-mounted transformers, underground cables, overhead cables on approximately 100 wooden poles, assorted circuit breakers and switches, electrical metering/protection devices, and the ADCC substation itself. Existing collection lines in the project area are owned by Patterson Pass. The Patterson Pass Project connects directly with PG&E through the ADCC substation to the 330 kVA transmission lines.

Meteorological Towers

Approximately 13 meteorological towers, 18–80 meters (60–263 feet) tall are present onsite. These towers monitor and record meteorological data such as wind speed, wind direction, and atmospheric pressure. Up to two existing towers will be utilized as the two permanent meteorological towers for the proposed project. All other existing meteorological towers will be removed during decommissioning or construction.

Proposed Project

The proposed project components are described below. The proposed project would entail three phases: decommissioning and removal of the existing windfarm facilities, construction of the proposed Patterson Pass Project, and operation of the proposed project. A conceptual layout of the proposed project is shown in Figure 2-11.

Decommissioning the Existing Facilities

Decommissioning the existing project would require removal of the wind turbine nacelles, blades, towers, and other facilities. Some facilities—such as the O&M building, substation, and one 80-meter meteorological towers—would be retained and may be upgraded as necessary. The O&M facility would continue to operate in support of the repowering project. In general, other facilities from the existing project that could not be reused—such as collection lines, some access roads, and turbine foundations—would be removed where feasible and in alignment with resource agency (USFWS and CDFW) recommendations. All removal activities would be carried out to minimize disturbance. It is anticipated that existing roads may be left in place to minimize disturbance (with upgrades as noted below). Equipment that cannot be salvaged would be disposed of at a properly licensed landfill. A list of existing structures and turbines that may be removed is shown in Table 2-5.

Table 2-5. Structures to be Decommissioned

Component	Quantity	Size
Wind turbines		
Turbine rotors to be removed	324	7.5-meter blades
Turbines/towers to be disassembled	128	60 ft
Turbines/towers to be disassembled	196	80 ft
Nordtank 65	118	80 ft
Bonus 65	206	80 ft
Turbines/towers to be removed	128	60 ft
Turbines/towers to be removed	196	80 ft
Turbine foundations to be buried	336	20 by 20 ft
Down tower box removed	n/a	
Down tower box foundation buried	n/a	
Electrical Equipment		
Transformers removed	46	500 kVA
Transformer foundations buried	46	13.5 by10 ft
Electrical poles with equip (fire safety clearing requirement)	48	
Riser poles	67	
Electrical OH lines removed (includes poles) (miles)	3.1	21 kVA
Underground power and communication lines 21kVA (miles)	3.59	21 kVA
Underground power and communication lines 480V (miles)	9.02	480 Volt
Met Towers		
Lattice met towers	5	60 ft
Lattice met towers	1	80 ft
Pole met towers	4	80 ft
Pole met towers	2	120 ft

Wind Turbines

The proposed turbines would be three-blade, upwind turbines on tubular towers (Figure 2-2). A range of turbines are being considered for the proposed project; each would have a nameplate capacity of 2.4–3.3 MW, a rotor diameter of 90–125 meters (295–410 feet), towers up to 84 meters (276 feet), and a maximum turbine height of 146 meters (480 feet). For example, the Vestas V112 3.3 MW turbine, with a 112-meter (367–foot) rotor diameter and 84-meter (276-foot) hub height, turns at 16.1 rpm. The tubular steel towers would have internal ladders to the nacelle, the color of towers and rotors would be neutral and nonreflective (e.g., dull white or light gray), and nacelles would be completely enclosed to minimize perching opportunities.

Each turbine would involve a 0.5-acre temporary laydown area to accommodate turbine components and the equipment necessary for turbine installation. Following installation, the laydown areas would be restored to preproject conditions.

Turbine placement would conform to the setback conditions shown in Table 2-2. All turbines would be sited no less than three times the total turbine height (i.e., from the ground surface to the tip of the blade in the 12 o'clock position) from any dwelling unit and 2.5 times the total turbine height from any public road, trail, recreation area, commercial or residential zoning, unless information in a report prepared by a qualified professional and verified by the County demonstrates that a lesser setback is adequate. In no case would a setback less than 50% of the established setback be allowed.

Temporary Staging Areas

The proposed project would likely require up to three temporary staging areas encompassing a total of up to 10 acres. To the extent possible, the laydown areas would be located in areas with existing turbines and access roads to minimize disturbance of natural habitats. Patterson Pass would use the staging areas for storage of turbine components, construction equipment, job trailers, and the materials needed for project construction. Access to the temporary staging areas would be from either Patterson Pass Road or Jess Ranch Road. Upon completion of construction, the temporary staging areas would be removed.

Foundations

The freestanding tubular towers would be mounted on steel and concrete foundations. Two types are being considered: the inverted T spread footing and the tensionless pier footing (Figure 2-4). Foundations would be designed in consideration of site-specific conditions and the design engineer's requirements. Once the foundation is constructed, the turbine towers would be anchored to the base with long steel bolts. The area surrounding each foundation would be restored by backfilling, compacting, and burying the foundation. Following backfilling, the foundation pedestal would stand approximately 1 foot above the surrounding grade.

Roadway Improvements

The proposed project would require up to 7 miles of private onsite access roads (Figure 2-11). During construction, access roads would be graded and temporarily graveled up to a width of 35 feet to allow sufficient space for two lanes of travel and to facilitate movement of large equipment (e.g., cranes, turbine components). Cut and fill necessary for road construction would be balanced onsite. No soil would be imported or exported for road construction. Gravel for construction of new roads would be trucked in from an existing source and would be compacted to form a stable road surface. To the extent possible, existing access roads would be reused; however the existing roads were constructed to accommodate much smaller first-generation turbines, and in many cases are not adequate to support construction or operation of the new project.

After construction, the road edges would be restored and reseeded, where appropriate, and the width of the roads would be reduced to 16 feet for continued use during O&M activities.

Access to the project area will be from Patterson Pass Road at the southern portion of the project area and from Jess Ranch Road at the northeast corner of the project area. Improvements to Patterson Pass Road (straightening, widening, or improving the turn into the project area) may be necessary to facilitate the delivery of turbines and associated parts. These improvements would be undertaken within the existing County right of way and/or within the project area, which abuts Patterson Pass Road. Improvements to Jess Ranch Road (widening the existing turn) may also be required to facilitate the turn into the project area.

A new access road would be constructed from Jess Ranch Road (shown in green in Figure 2-11). This modified alignment would avoid both wetlands and occupied burrowing owl habitat and would be built regardless of which of the additional three road options (discussed below) is selected.

Three roadway options are being considered to reduce onsite grading, of which only one would be selected. Option 1 (shown in purple in Figure 2-11) would be approximately 4,562 feet long and was considered as the likely option in the Draft PEIR. Option 1 would result in the most disturbance. Option 2 (shown in blue in Figure 2-11) would be approximately 2,719 feet long and would entail improving an existing road from the north through the Golden Hills project area. (The proponent of the Golden Hills Project proposes improvement of this existing access road as part of the Golden Hills Project, as shown in Figure 2-10 of the Draft PEIR.) For Option 2, approximately 350 feet of new roadway would be constructed to connect the Golden Hills project area to the Patterson Pass project area. Option 3, approximately 2,312 feet long, would bypass burrowing owl habitat and would consequently result in fewer impacts than Option 1. Option 3 would likely be selected if access rights for Option 2 cannot be obtained. Both Options 2 and 3 would create fewer temporary and permanent impacts than Option 1, which was analyzed and disclosed in the Draft PEIR; accordingly, selection of either option would not result in any new significant impacts.

Power Collection System

Electrical collection lines for the proposed project would be underground from each turbine site to the existing substation. The buried cable system may include junction boxes that would house cable splices and allow access to the cable for any needed maintenance or repairs. The cables be buries using an open trenching method or would be installed using horizontal directional drilling (HDD) technology. The cables would be buried approximately 36–48 inches deep. The conceptual layout of the power collection system is shown in Figure 2-11. The temporary disturbance area for cable installation would be minimized to the extent feasible; it would typically be approximately 20 feet wide in most locations.

The power collection system would connect to the existing ADCC substation, and then through the short existing gen-tie overhead line into the existing PG&E transmission lines that traverse the project area. Because the proposed project would have electrical generation capacity similar to that of the existing project, no substantial modifications to the substation (outside the existing fenceline) or PG&E transmission line are anticipated. Some minor equipment improvements within the existing substation footprint may be completed to replace old equipment or to bring the equipment up to current safety and operational standards. All work would be conducted within the graveled footprint of the existing substation.

Operations and Maintenance Facility and Other Project Elements

The proposed project would use the existing 4,600-square-foot O&M building. Operations, storage, and repairs would take place at the existing facility, which would receive power from a temporary generator during the decommissioning and construction phases. Upon completion of construction, the O&M facility would receive power from the existing powerlines on Patterson Pass Road. Some expansion of the O&M facility may be necessary to accommodate construction and new security requirements. Portable restrooms would be used during the construction phase, and the existing O&M building restroom facilities would be used during O&M activities.

Project Construction

Patterson Pass would begin construction of the proposed project after certification of a Final EIR and receipt of all required permits. Construction, including decommissioning of the existing facilities, would likely occur early in 2015 and would conclude 6–9 months later. Typical construction steps are listed below.

- Demarcation of construction areas and any sensitive biological, cultural, or other resources needing protection.
- Decommissioning of the existing wind farm.
  - Disassembly of existing turbines.
  - Removal of foundations as required for new road and turbine construction.
  - Restoration.
- Construction of temporary staging areas.
- Grading and road construction.
- Turbine foundation construction.
- Power collection system and communication line installation.
- Turbine installation.
- Upgrades to the substation (as required).
- Erosion and sediment control.
- Final road construction.
- Final cleanup and restoration.

The construction of any expansion necessary at the existing O&M building would not depend on the sequence of construction for the rest of the project.

The construction contractors would prepare the project area, deliver and install the project facilities, oversee construction, and complete final cleanup and restoration of the construction sites. Patterson Pass would implement BMPs consistent with standard practice and with the requirements of this EIR and any state or federal permits to minimize soil erosion, sedimentation of drainages downslope of the project area, and any other environmental impacts. Examples of likely erosion control measures are listed below.

- Use of straw wattles, silt fences/straw bale dikes, and straw bales to minimize erosion and collect sediment (to protect wildlife, no monofilament-covered sediment control measures would be used).
- Re-seeding and restoration of the site.

- Maintenance of erosion control measures.
- Regular inspection and maintenance of erosion control measures.

Construction traffic routing would be established in a Construction Traffic Plan, which would include a traffic safety and signing plan prepared by EDF RE in coordination with the County and other relevant agencies. The plan would define hours, routes, and safety and management requirements.

The construction activities and the approximate duration of each are listed below.

- Phase 1—Decommissioning of existing plant: 4 weeks.
- Phase 2—Laydown area: 2 weeks.
- Phase 3—Road construction: 16 weeks.
- Phase 4—Foundations/electrical: 12 weeks.
- Phase 5—Turbine delivery and installation: 12 weeks.
- Phase 6—Electrical trenching: 14 weeks.
- Phase 7—Cleanup: 12 weeks.

Project Decommissioning

The proposed project is assumed to have a useful life of approximately 25–30 years, based on current turbine designs and expected service life. New technology may become available for another repowering of the proposed project in the future. Decommissioning the proposed project would require removal of the wind turbine nacelles, blades, towers, and other facilities.
In general, other project facilities that could not be reused—such as collection lines, some access roads, and turbine foundations—would be removed, except in cases where removal would result in substantial impacts on terrestrial species or habitats (e.g., some turbine foundations, roads). Any removal of facilities would be undertaken to minimize disturbance.

2.7 Other Future Projects and Applications

Several potential repowering projects would be undertaken in the APWRA. At this time, there is not enough specific detail on these projects to evaluate them at a project level. Table 2-6 shows the names of each of these projects, and the nameplate capacity of each project.

Table 2-6. Other Future Projects

Project Name	Nameplate Capacity (MW)
Golden Hills Phase 2 (Golden Hills)[a]	41
Summit Wind (AWI)	95
Mulqueeney Ranch (Brookfield)	80
Sand Hills Wind (Ogin)[a]	34

[a] Golden Hills Phase 2 is a proposed project that would be evaluated under a subsequent CEQA document. The project consists of approximately 24 General Electric 1.7 MW turbines on 80-meter towers. The Golden Hills Phase 2 CEQA document is anticipated for release shortly after the completion of the Final PEIR.

[b] Sand Hills Wind is a 34 MW project currently being evaluated under a separate CEQA document. Although a 4 MW pilot project using an experimental turbine design is currently in development, for the purposes of the program-level analysis in this PEIR, it has been assumed that the Sand Hills project in its entirety would be constructed using conventional fourth-generation turbines.

2.8 References Cited

Alameda County. 1998. *Draft Environmental Impact Report—Repowering a Portion of the Altamont Pass Wind Resource Area*. August. State Clearinghouse #98022024. Hayward, CA: Alameda County Community Development Agency.

Alameda County Scientific Review Committee. 2007. *SRC Selection of Dangerous Wind Turbines*. P67.

———. 2008a. *SRC Hazardous Turbine Rating Lis*t. P68. Updated March 16, 2008.

———. 2008b. *Hazardous Rating Scale of the SRC*. P69. February 1. Final.

———. 2008c. *Guidelines for Siting Wind Turbines Recommended for Relocation to Minimize Potential Collision-Related Mortality of Four Focal Raptor Species in the Altamont Pass Wind Resource Area*. P70. February 7.

Barclay, R. M. R., E. F. Baerwald, and J. C. Gruver. 2007. Variation in Bat and Bird Fatalities at Wind Energy Facilities: Assessing the Effects of Rotor Size and Tower Height. *Canadian Journal of Zoology* 85:381–387.

Brown, K., K. S. Smallwood, and B. Karas. 2013*. Vasco Avian and Bat Monitoring Project 2012–2013 Annual Report*. Final. September. Prepared by Ventus Environmental Solutions, Portland, OR. Prepared for NextEra Energy Resources, Livermore, CA.

ICF Jones & Stokes. 2009. *Altamont Pass Wind Resources Area 48-Hour Search Interval Bird Fatality Study*. Draft. June. (ICF 00904.08.) Sacramento, CA. Prepared for Altamont County Community Development Agency, Hayward, CA.

Insignia Environmental. 2009. *2008/2009 Annual Report for the Buena Vista Avian and Bat Monitoring Project*. September 4. Martinez, CA. Prepared for Contra Costa County.

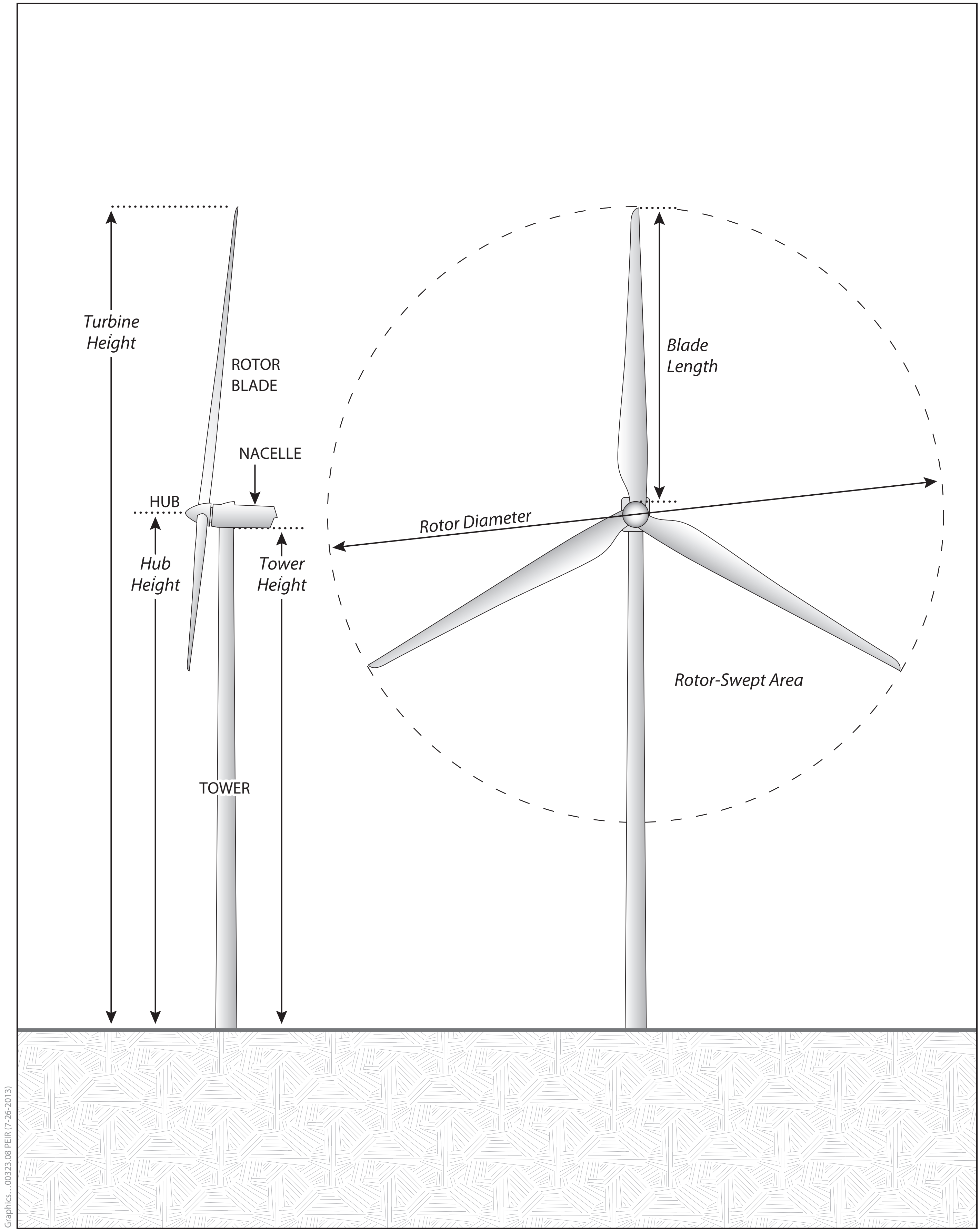
Kerlinger, P., J. L. Gehring, W. P. Erickson, R. Curry, A. Jain, and J. Guarnaccia. 2010. Night Migrant Fatalities and Obstruction Lighting at Wind Turbines in North America. *The Wilson Journal of Ornithology* 122(4):744–754.

Smallwood, K. S. 2008. *Assessment of Relocation/Removal of Altamont Pass Wind Turbines Rated as Hazardous by the Alameda County SRC*. P103.

Smallwood, K. S., and B. Karas. 2009. Avian and Bat Fatality Rates at Old-Generation and Repowered Wind Turbines in California. *Journal of Wildlife Management* 73(7):1062–1071.

Smallwood, K. S., and L. Neher. 2010. *Siting Repowered Wind Turbines to Minimize Raptor Collisions at the Tres Vaqueros Wind Project, Contra Costa County, California*. April. Draft. Prepared for the East Bay Regional Park District.

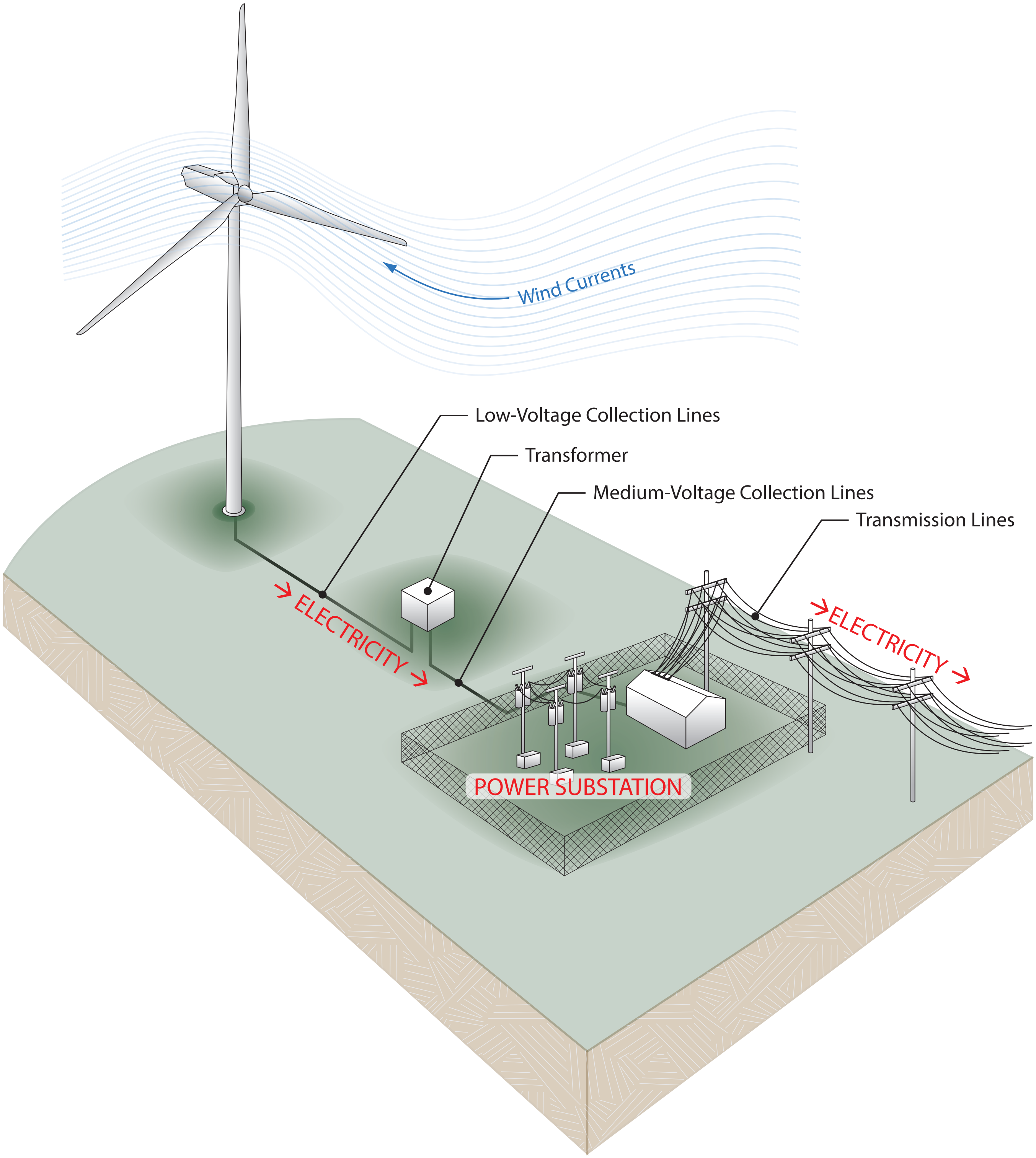
Figure 2-1
Overview of Wind Turbine Components



ICF INTERNATIONAL

Altamont Pass Wind Resource Area
Repowering Program

Figure 2-2
Wind Turbine Dimensions



Graphics...00323.08 PEIR (5-2013)

Altamont Pass Wind Resource Area
Repowering Program

Figure 2-3
Collection System

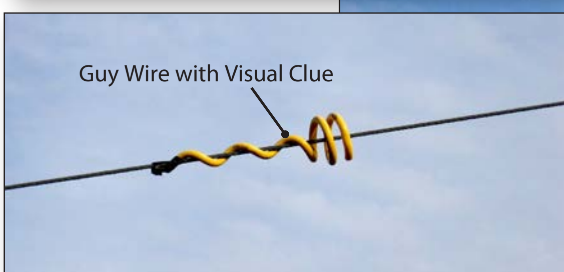
Pier Foundation for Lattice Tower

Spread Footing Foundation for Lattice Tower

Spread Footing Foundation for Tubular Tower (Down Tower Cabinet inside Tower)

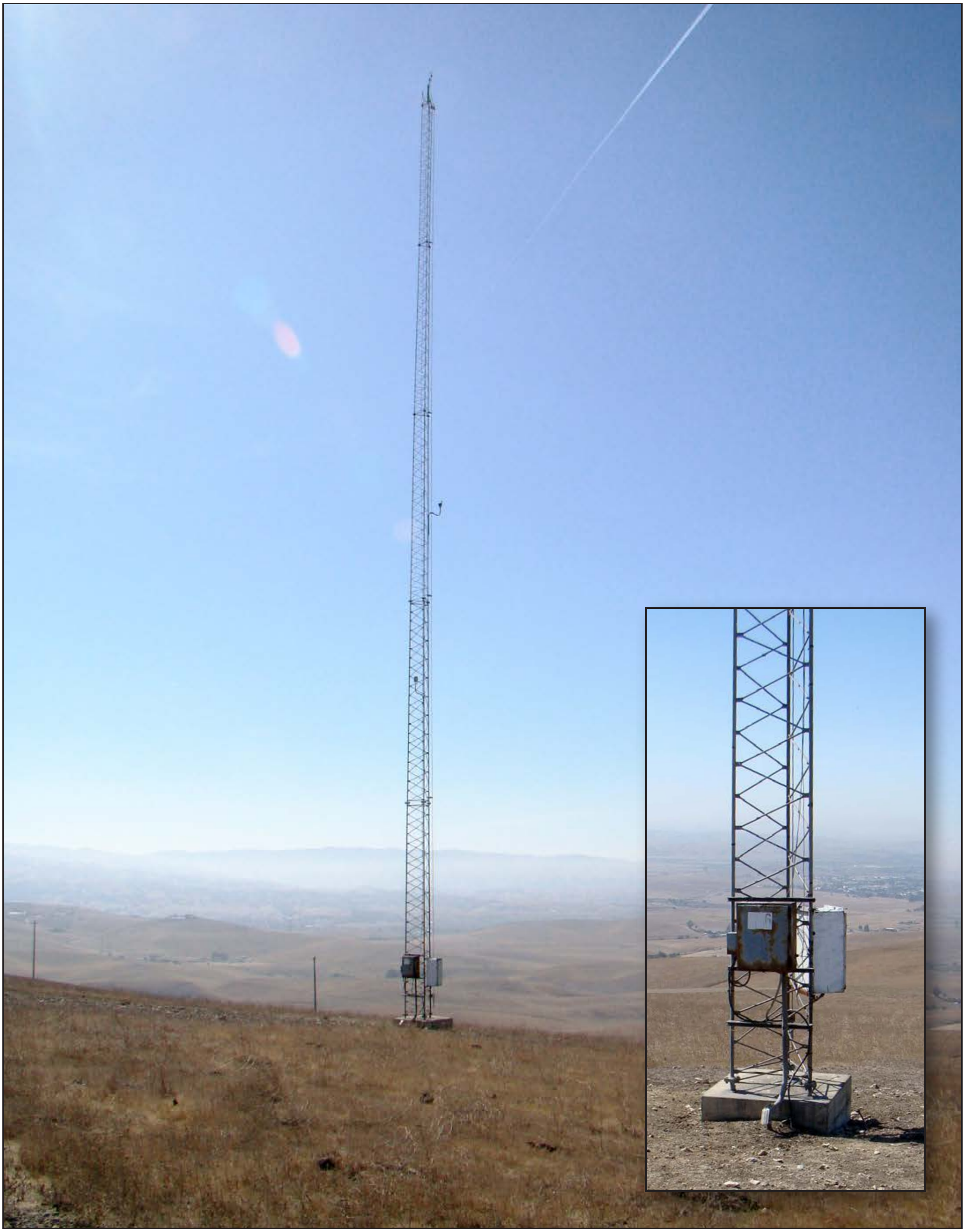
Base of Diablo Winds Vestas V47 Turbine (Pier Foundation)

Figure 2-4
Wind Turbine Foundations and Down Tower Cabinet Placement



Graphics…00323.08 PEIR (7-26-2013)

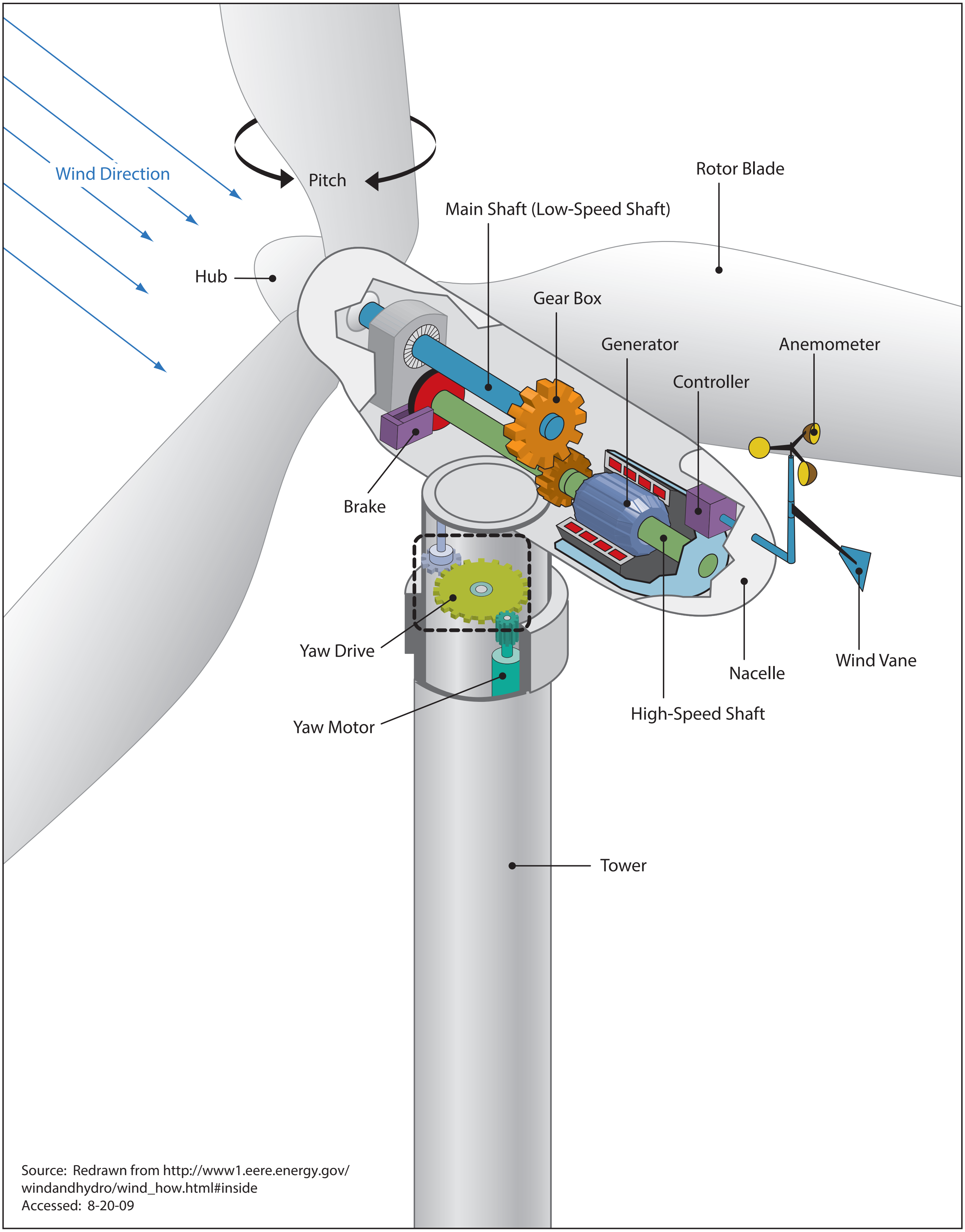
Figure 2-5
Temporary Meteorological Tower with Guy Wires



Graphics...00323.08 PEIR (7-26-2013)

Altamont Pass Wind Resource Area
Repowering Program

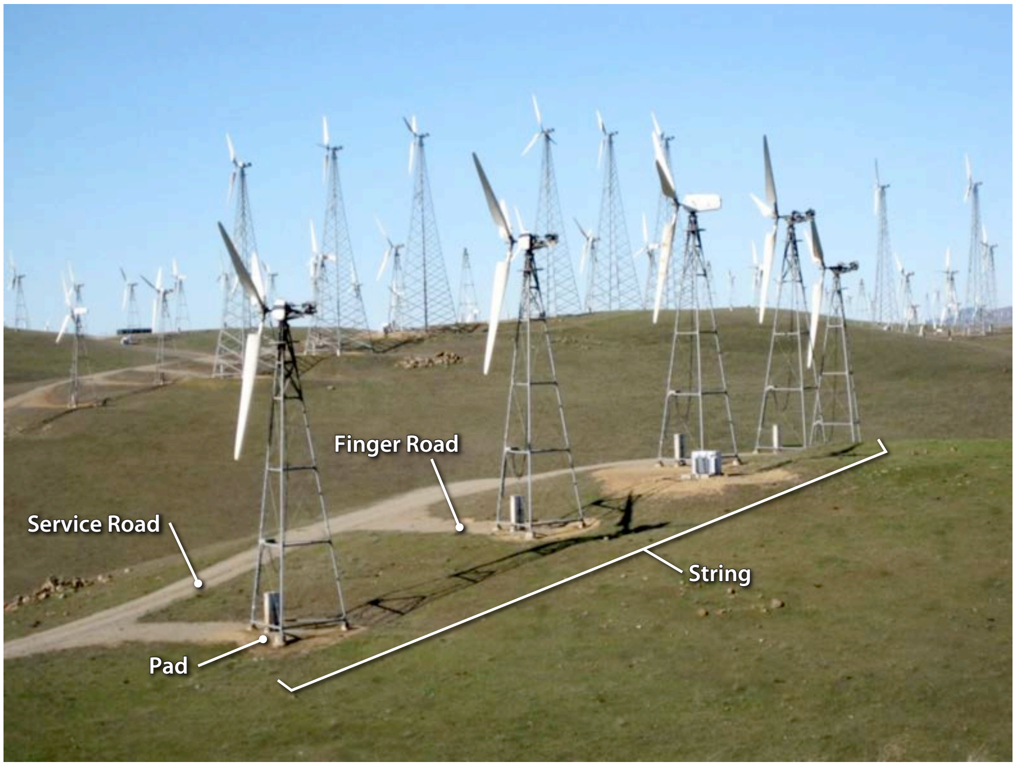
Figure 2-6
Free-Standing Permanent Meteorological Tower



Source: Redrawn from http://www1.eere.energy.gov/windandhydro/wind_how.html#inside
Accessed: 8-20-09

Graphics...00323.08 PEIR (7-26-2013)

Figure 2-7
Nacelle Detail



Overhead View

Figure 2-8
Existing Road Configuration

In flat areas, the foundation is broken up and buried in a hole adjacent to foundation. The area is then graded and seeded.

Excavation of hole adjacent to foundation

Breaking up the foundation

Graded area is ready for seeding

On high slope areas the foundations are covered with at least 3 feet of topsoil. The area is then graded and seeded.

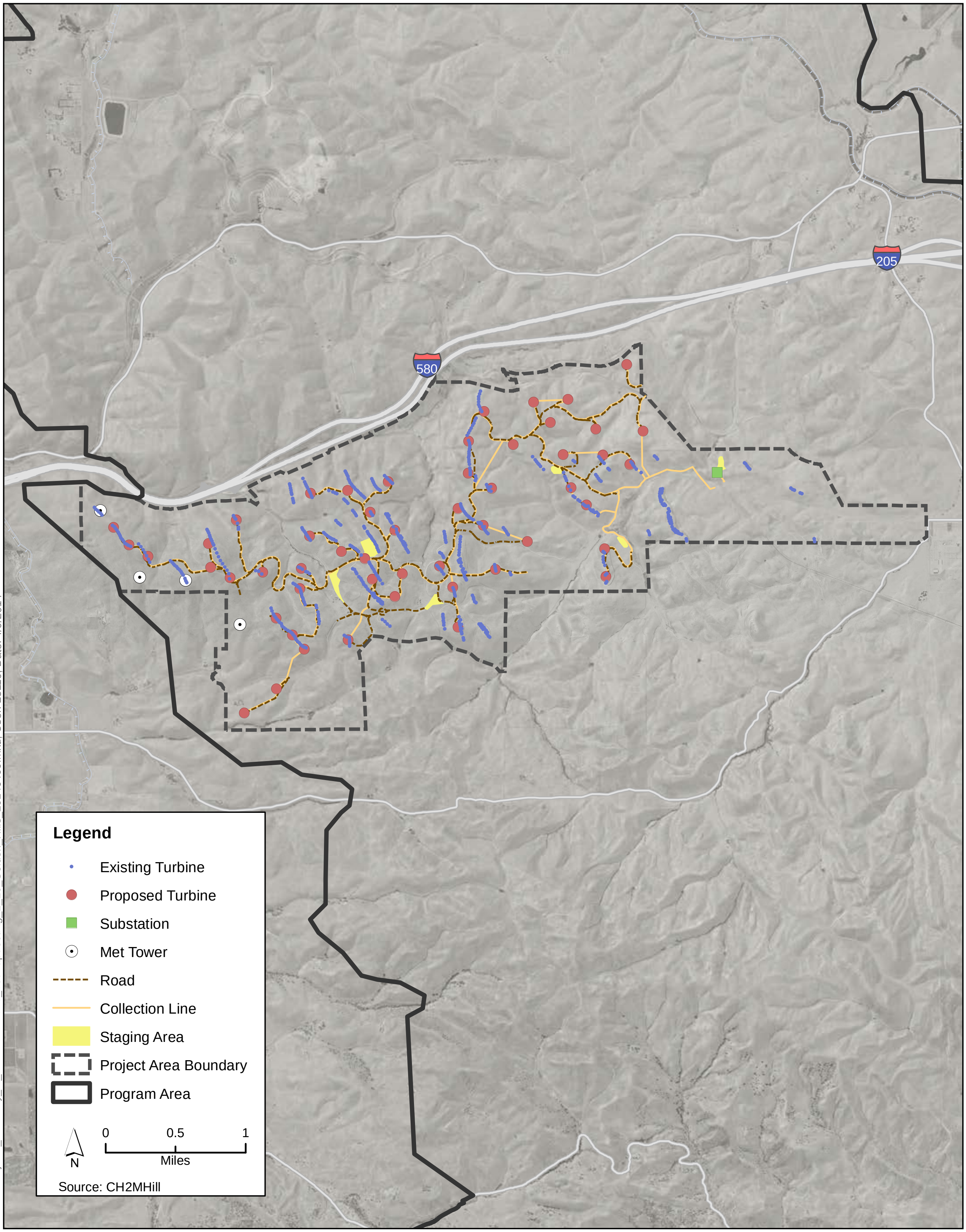
Foundation location on high slope area

Dirt is moved from the lower bank to fill in the turbine pad area and foundation

Area has been graded and seeded

Graphics ... 00323.08 (7-26-2013)

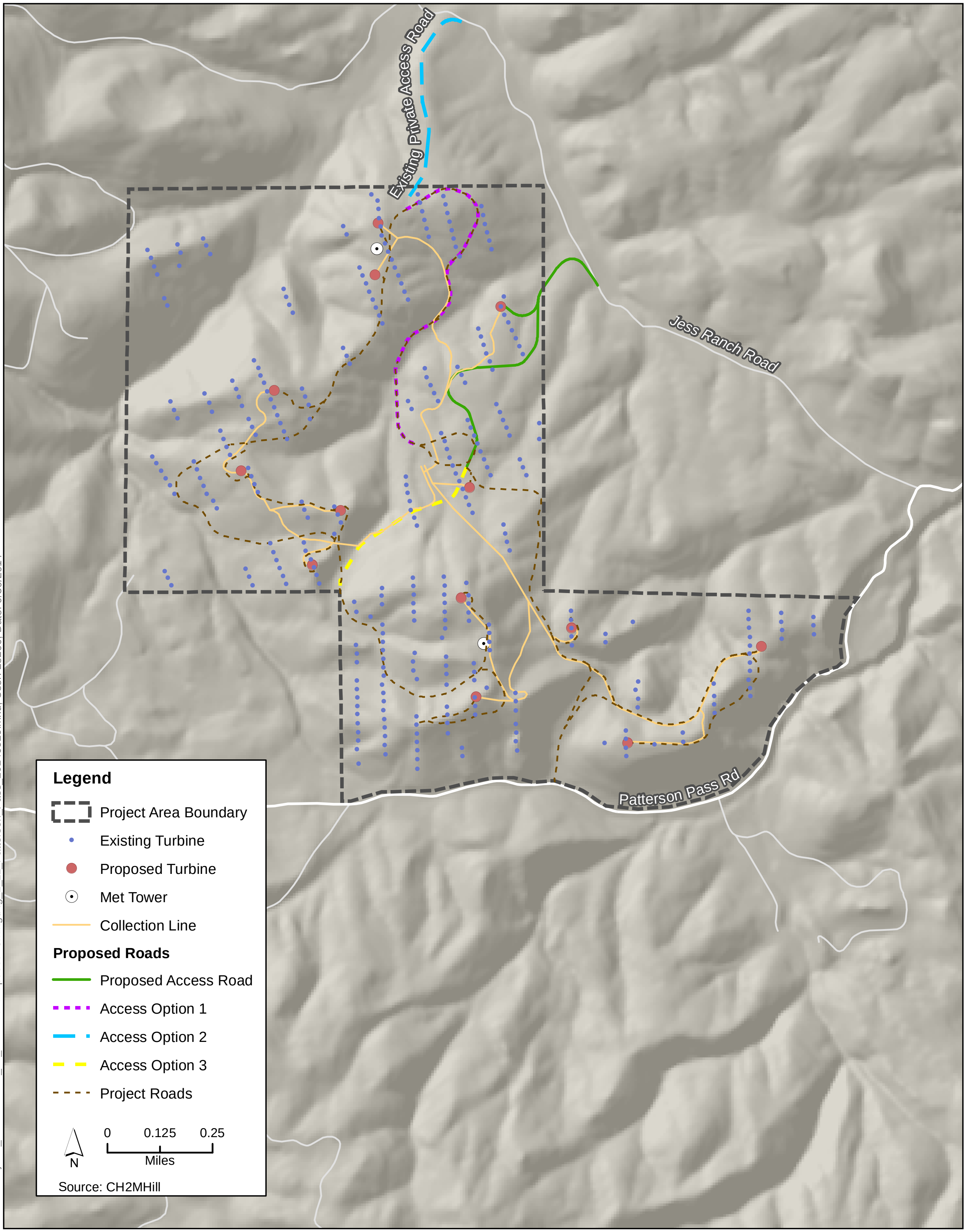
Figure 2-9
Turbine Foundation Removal and Reclamation



Path: K:\Projects_1\County_of_Alameda\00323_08\mapdoc\Fig_2_10_Golden_Hills_20140409.mxd; User: 25110; Date: 4/9/2014

Altamont Pass Wind Resource Area
Repowering Program

Figure 2-10
Golden Hills Wind Project



Path: K:\Projects_3\EDF\00563_13_Patterson\mapdoc\Working\Fig_2_11_Patterson_Pass_20140929.mxd; User: 28266; Date: 9/30/2014

Altamont Pass Wind Resource Area
Repowering Program

Figure 2-11
Patterson Pass Wind Project

Chapter 3
Impact Analysis

This chapter provides environmental analyses of the physical impacts that could occur as a result of implementation of the program. The chapter is organized into separate sections for each resource analyzed, as listed below. Each section provides a description of the environmental and regulatory setting, significance criteria and methodology used in the impact analysis, and the potential impacts and required mitigation measures. For each potential impact, the impacts of each of the two program alternatives and the impacts of each of the proposed projects are presented at an equal level of detail.

Specific details of the Golden Hills and Patterson Pass Projects, as described in Chapter 2, were used for the analyses in this chapter. Design of future projects, for which applications have not yet been received by the County, including turbine layout and the size and number of turbines, are not yet known.

Program-level analyses related to ground disturbance were conducted using a set of assumptions developed through extrapolation from specific metrics provided for recent Altamont Pass repowering projects. Using these metrics and professional judgment, the standardized metrics reflecting the range of turbines commonly proposed are shown in Table 3-1 and were considered to be appropriate for analyses at the program level.

Table 3-1. Standardized Disturbance Area Metrics Used in the Program-Level Analyses

Project Element	Disturbance Area Metric	1.6 MW Turbines (50 turbines/project)	3.0 MW Turbines (27 turbines/project)
Road infrastructure[a]	Permanent *per turbine: 2.4 ac*	120 ac	64.8 ac
	Temporary *per turbine: 0 ac*	0 ac	0 ac
Laydown areas (including crane pad)	Permanent *Per turbine: 0 ac*	0 ac	0 ac
	Temporary *Per turbine: 0.5 ac*	25 ac	13.5 ac
Turbine foundations[b]	Permanent *per turbine: 0.06 ac*	3 ac	1.6 ac
	Temporary *per turbine: 0.05 ac*	2.5 ac	1.4 ac
Staging areas[c]	Permanent *per turbine: 0 ac*	0 ac	0 ac
	Temporary *per turbine: 1.2 ac*	60 ac	32.4 ac
Underground collection lines[d]	Permanent *per turbine: 0 ac*	0 ac	0 ac
	Temporary *per turbine: 0.28 ac*	45.8 ac	24.7 ac

Project Element	Disturbance Area Metric	1.6 MW Turbines (50 turbines/project)	3.0 MW Turbines (27 turbines/project)
Electrical substation	Permanent *per project: 1 substation*	3 ac	3 ac
	Temporary *per project: 1 substation*	3 ac	3 ac
Meteorological towers	Permanent *per project: 4*	0.06 ac	0.06 ac
	Temporary *per project: 4*	0.02 ac	0.02 ac
Decommissioning old turbines	Permanent *per turbine: 0 ac*	0 ac	0 ac
	Temporary *per turbine: 1,600 sq ft*	–	–

Note: generic projects are assumed to consist of 80 MW nameplate capacity.

[a] Assumes 1,999 linear ft per turbine; permanent disturbance width of 52 ft.

[b] Based on 60-ft-diameter permanent disturbance area. Temporary disturbance area extends 20 feet beyond permanent disturbance area.

[c] Up to six staging areas of 5–10 acres each per project.

[d] Temporary disturbance of 20 x 600 ft per turbine.

The per-turbine and per-project metrics shown in Table 3-1 were averaged to arrive at a per-MW amount of permanent and temporary disturbance, which was then extrapolated to the nameplate capacities of the two program alternatives. Using the standardized metrics shown in Table 3-1, the two program alternatives would result in the estimated amount of permanent and temporary disturbance shown in Table 3-2.

Table 3-2. Extent of Disturbance Associated with the Program Alternatives

	1.6 MW Turbines		3.0 MW Turbines	
Description	Permanent	Temporary	Permanent	Temporary
Total disturbance per 80 MW project	126.1	111.32	69.5	75.0
Disturbance per MW	1.58	1.39	0.87	0.93
Alternative 1—417 MW	659	580	363	388
Alternative 2—450 MW	711	626	392	419

Note: all areas of disturbance are in acres. An 80 MW project using 1.6 MW turbines would entail 50 turbines. An 80 MW project using 3.0 MW turbines would entail 27 turbines.

Since the types of turbines that will be proposed as a part of future repowering projects are not known, the program analysis was structured to assess the greatest likely extent of impacts. Since a greater number of smaller nameplate capacity turbines would be required to achieve the total capacity of the repowering program, the program-level analysis assumed that 1.6 MW turbines would be used. That assumption is carried throughout the analyses in this chapter.

This chapter is organized into the following sections.

- 3.1, *Aesthetics*
- *3.2, Agricultural and Forestry Resources*
- 3.3, *Air Quality*
- 3.4, *Biological Resources*
- 3.5, *Cultural Resources*
- 3.6, *Geology, Soils, Mineral Resources, and Paleontological Resources*
- 3.7, *Greenhouse Gas Emissions*
- 3.8, *Hazards and Hazardous Materials*
- 3.9, *Hydrology and Water Quality*
- 3.10, *Land Use and Planning*
- 3.11, *Noise*
- 3.12, *Population and Housing*
- 3.13, *Public Services*
- 3.14, *Recreation*
- 3.15, *Transportation/Traffic*
- 3.16, *Utilities and Service Systems*

Each impact discussion is divided into two program-level and two project-level impacts. For example, in Section 3.1, *Aesthetics*, the first impact is presented as shown below.

Impact AES-1a-1: Temporary visual impacts caused by construction activities—program Alternative 1: 417 MW (less than significant with mitigation)

Impact AES-1a-2: Temporary visual impacts caused by construction activities—program Alternative 2: 450 MW (less than significant with mitigation)

Impact AES-1b: Temporary visual impacts caused by construction activities—Golden Hills Project (less than significant with mitigation)

Impact AES-1c: Temporary visual impacts caused by construction activities—Patterson Pass Project (less than significant with mitigation)

3.1 Aesthetics

This section identifies and evaluates issues related to visual resources in the program and project areas.

The *Existing Conditions* discussion below describes the current setting. The purpose of this information is to establish the existing environmental context against which the reader can understand the environmental changes caused by the proposed program and individual projects. The environmental setting information is intended to be directly or indirectly relevant to the subsequent discussion of impacts. For example, the setting identifies groups of people who have views of the program and project areas because the repowering activities could change their views and experiences.

The environmental changes associated with the program and the two individual projects are discussed in Section 3.1.3, *Environmental Impacts*. This section identifies impacts, describes how they would occur, and prescribes mitigation measures to reduce significant impacts, if necessary.

3.1.1 Concepts and Terminology

Identifying a project area’s visual resources and conditions involves three steps.

1. Objective identification of the visual features (visual resources) of the landscape.
2. Assessment of the character and quality of those resources relative to overall regional visual character.
3. Determination of the importance to people, or *sensitivity*, of views of visual resources in the landscape.

The aesthetic value of an area is a measure of its visual character and quality, combined with the viewer response to the area (Federal Highway Administration 1988). Scenic quality can best be described as the overall impression that an individual viewer retains after driving through, walking through, or flying over an area (U.S. Bureau of Land Management 1980). Viewer response is a combination of viewer exposure and viewer sensitivity. Viewer exposure is a function of the number of viewers, number of views seen, distance of the viewers, and viewing duration. Viewer sensitivity relates to the extent of the public’s concern for a particular viewshed. These terms and criteria are described in detail below.

Visual Character

Natural and artificial landscape features contribute to the visual character of an area or view. Visual character is influenced by geologic, hydrologic, botanical, wildlife, recreational, and urban features. Urban features include those associated with landscape settlements and development, including roads, utilities, structures, earthworks, and the results of other human activities. The perception of visual character can vary significantly seasonally, even hourly, as weather, light, shadow, and elements that compose the viewshed change. The basic components used to describe visual character for most visual assessments are the elements of form, line, color, and texture of the landscape features (U.S. Forest Service 1995; Federal Highway Administration 1988). The appearance of the landscape is described in terms of the dominance of each of these components.

Visual Quality

Visual quality is evaluated using the well-established approach to visual analysis adopted by Federal Highway Administration, employing the concepts of vividness, intactness, and unity (Federal Highway Administration 1988; Jones et al. 1975), which are described below.

- Vividness is the visual power or memorability of landscape components as they combine in striking and distinctive visual patterns.
- Intactness is the visual integrity of the natural and human-built landscape and its freedom from encroaching elements; this factor can be present in well-kept urban and rural landscapes, and in natural settings.
- Unity is the visual coherence and compositional harmony of the landscape considered as a whole; it frequently attests to the careful design of individual components in the landscape.

Visual quality is evaluated based on the relative degree of vividness, intactness, and unity, as modified by its visual sensitivity. High-quality views are highly vivid, relatively intact, and exhibit a high degree of visual unity. Low-quality views lack vividness, are not visually intact, and possess a low degree of visual unity.

Visual Exposure and Sensitivity

The measure of the quality of a view must be tempered by the overall sensitivity of the viewer. Viewer sensitivity or concern is based on the visibility of resources in the landscape, proximity of viewers to the visual resource, elevation of viewers relative to the visual resource, frequency and duration of views, number of viewers, and type and expectations of individuals and viewer groups.

The importance of a view is related in part to the position of the viewer to the resource; therefore, visibility and visual dominance of landscape elements depend on their placement within the viewshed. A viewshed is defined as all of the surface area visible from a particular location (e.g., an overlook) or sequence of locations (e.g., a roadway or trail) (Federal Highway Administration 1988). To identify the importance of views of a resource, a viewshed must be broken into distance zones of foreground, middleground, and background. Generally, the closer a resource is to the viewer, the more dominant it is and the greater its importance to the viewer. Although distance zones in a viewshed may vary between different geographic region or types of terrain, the standard foreground zone is 0.25–0.5 mile from the viewer, the middleground zone from the foreground zone to 3–5 miles from the viewer, and the background zone from the middleground to infinity (Jones et al. 1975).

Visual sensitivity depends on the number and type of viewers and the frequency and duration of views. Visual sensitivity is also modified by viewer activity, awareness, and visual expectations in relation to the number of viewers and viewing duration. For example, visual sensitivity is generally higher for views seen by people who are driving for pleasure, people engaging in recreational activities such as hiking, biking or camping, and homeowners. Sensitivity tends to be lower for views seen by people driving to and from work or as part of their work (U.S. Forest Service 1995; Federal Highway Administration 1988; U.S. Soil Conservation Service 1978). Commuters and nonrecreational travelers generally have fleeting views and tend to focus on commute traffic, not on surrounding scenery; therefore, they are generally considered to have low visual sensitivity. Residential viewers typically have extended viewing periods and are concerned about changes in the views from their homes; therefore, they are generally considered to have high visual sensitivity.

Viewers using recreation trails and areas, scenic highways, and scenic overlooks are usually assessed as having high visual sensitivity.

Judgments of visual quality and viewer response must be made based in a regional frame of reference (U.S. Soil Conservation Service 1978). The same landform or visual resource appearing in different geographic areas could have a different degree of visual quality and sensitivity in each setting. For example, a small hill may be a significant visual element on a flat landscape but have very little significance in mountainous terrain.

3.1.2 Existing Conditions

Regulatory Setting

Federal

The federal government does not explicitly regulate visual quality but recognizes its importance and preserves aesthetic values through the National Park, National Wildlife Refuge, National Monument, and National Scenic Byway Systems.

State

Interstate 580 (I-580) from the San Joaquin County line to State Route (SR) 205 (Post Miles 0.0 to 0.393), a 0.4 mile long segment, is a state-designated scenic highway (California Department of Transportation 2012). The I-580 intersection with SR 205 falls just within the eastern border of the program area.

Local

Alameda County General Plan

Scenic Route Element

The Scenic Route Element of the Alameda County General Plan (Scenic Route Element) provides a continuous, countywide scenic route system and is intended to serve as a guide for local jurisdictions for development of city-scale scenic route systems and as a guide for development to protect and enhance the scenic values along designated scenic routes (Alameda County 1966).

The Scenic Route Element identifies scenic freeways and expressways as traversing or connecting areas of major scenic, recreational, or cultural attractions, and as distinct from two other major types of scenic routes (scenic thoroughfares and rural-recreation routes). Scenic routes are defined to consist of three elements: the right-of-way, the scenic corridor, and areas extending beyond the corridor. The corridor is defined as those properties, along and up to 1,000 feet beyond the right-of-way, that either (1) should be acquired for protection, or (2) for which development controls should be applied to preserve and enhance nearby views or maintain unobstructed distant views along the route in rural areas with high scenic qualities. More specifically, scenic corridors are defined as those areas where "Development controls should be applied to preserve and enhance scenic qualities, restrict unsightly use of land, control height of structures, and provide site design and architectural guidance along the entire scenic corridor" (Alameda County 1966). For the areas extending beyond scenic corridors (i.e., beyond 1,000 feet from the right-of-way), the Scenic Route Element also requires basic development controls: in the undeveloped parts of the county, project review should address grading, removal of vegetation, streambeds, landscaping, utility and communication towers, poles and lines, and outdoor advertising signs or structures.

The program area contains one state-designated scenic route, I-580, which is also categorized as one of the County's Scenic Freeways and Expressways. Most of the other roads and highways that traverse the program area are categorized as Scenic Rural-Recreation Routes (or as mapped Major Rural Roads); these are listed below (Alameda County 1966).

- Altamont Pass Road
- Byron-Bethany Road
- Flynn Road
- Grant Line Road
- Mountain House Road
- Patterson Pass Road
- Proposed Route 239 Freeway
- Tesla Road
- Vasco Road

The Scenic Route Element provides the following principles for Scenic Route Corridors that may apply to the repowering program as well as the Golden Hills and Patterson Pass Projects. The principles are organized loosely under five headings: the system, the rights-of-way, the corridors, the corridors *and* the remainder or balance of the County, and areas beyond the corridors. For reference in the subsequent discussions, each principle is identified by a code (e.g., SRE-Corr-1).

> **Provide for Normal Uses of Land and Protect Against Unsightly Features:** In both urban and rural areas, normally permitted uses of land should be allowed in scenic corridors, except that panoramic views and vistas should be preserved and enhanced through supplementing normal zoning regulations with special height, area, and sideyard regulations; through providing architectural and site design review; through prohibition and removal of billboards, signs not relevant to the main use of the property, obtrusive signs, automobile wrecking and junk yards, and similar unsightly development or use of land. Design and location of all signs should be regulated to prevent conglomerations of unsightly signs along roadsides. (SRE-Corr-1).
>
> **Locate Transmission Towers and Lines Outside of Scenic Route Corridors When Feasible:** New overhead transmission towers and lines should not be located within scenic corridors when it is feasible to locate them elsewhere. (SRE-Corr-2).
>
> **Underground Utility Distribution Lines When Feasible; Make Overhead Lines Inconspicuous:** New, relocated or existing utility distribution lines should be placed underground whenever feasible. When it is not feasible to place lines underground, they should be located so as to be inconspicuous from the scenic route. Poles of an improved design should be used wherever possible. Combined or adjacent rights-of-way and common poles should be used wherever feasible. (SRE-Corr-3).
>
> **Use Landscaping to Increase Scenic Qualities of Scenic Route Corridors:** Landscaping should be designed and maintained in scenic route corridors to provide added visual interest, to frame scenic views, and to screen unsightly views. (SRE-Corr-5).
>
> **Control Tree Removal:** No mature trees should be removed without permission of the local jurisdiction as a means of preserving the scenic quality of the county. (SRE-Corr/Rem-5).
>
> **Control Alteration of Streambeds and Bodies of Water:** Alteration of streambeds or bodies of water and adjacent vegetation should be permitted only with approval of the local jurisdiction, as a means of

preserving the natural scenic quality of the stream courses, bodies of water, vegetation and wildlife in the county. Development along edges of streams, canals, reservoirs, and other bodies of water should be designed and treated so as to result in naturalistic, architectural, or sculptural forms. (SRE-Corr/Rem-6).

Preserve and Enhance Natural Scenic Qualities in Areas Beyond the Scenic Corridor: Views from scenic routes will comprise essentially all of the remainder of the county beyond the limits of the scenic corridor: the corridor is intended to establish a framework for the observation of the views beyond. Therefore, in all areas in the county extending beyond the scenic route corridors, scenic qualities should be preserved through retaining the general character of natural slopes and natural formations, and through preservation and enhancement of water areas, watercourses, vegetation and wildlife habitats. Development of lands adjacent to scenic route corridors should not obstruct views of scenic areas and development should be visually compatible with the natural scenic qualities. (SRE-Beyond Corr-1).

Provide for Normal Uses of Land but Limit Overhead Utilities and Outdoor Advertising Structures: In both developed and undeveloped areas, outdoor advertising structures, utility and communication towers, poles, and wires should be located only where they will not detract from significant scenic views. All other structures and use of land should be permitted as specified in the local zoning ordinance as supplemented by special height regulations. (SRE-Beyond Corr-2)

Lastly, the Scenic Route Element establishes development standards that may apply to the program and the Golden Hills and Patterson Pass Projects.

Alteration to natural or artificial land contours should not be permitted without a grading permit issued by the local jurisdiction as a means of preserving and enhancing the natural topography and vegetation in developable areas. Mass grading should not be permitted. The following criteria should be applied in the review of grading permits in developable areas:

- As a means of preserving natural *ridge skylines* within the county, no major ridgeline should be altered to the extent that an artificial ridgeline results.
- Access roads should be located and designed to keep grading to a minimum.
- Natural ground contours in slope areas over 10% should not be altered more than 5% overall, except in such slope areas where large stands of mature vegetation, scenic natural formations or natural watercourses exist, where grading should be limited so as to preserve the natural features.
- Any contour altered by grading should be restored by means of land sculpturing in such a manner as to minimize run-off and erosion problems, and should be planted with low maintenance, fire resistant plant materials that are compatible with the existing environment.

Open Space Element

The following principles from the Open Space Element of the General Plan (Open Space Element) may apply to the program and the Golden Hills and Patterson Pass Projects.

Include Natural Ridgelines and Slope Areas: Natural ridgelines, and slopes in excess of twenty-five percent in grade, should be left as open space to eliminate mass grading.

Consolidate and Locate Utility Lines to Avoid Scenic Areas: Wherever feasible, power and pipe utility lines should be consolidated to prevent further severance of open space lands. Utility lines and aqueducts in open space areas should be located so as to avoid areas of outstanding beauty.

Natural Resources within Open Space Areas Should be Permanently Protected: Within open space areas, either publicly or privately owned, removal of mature trees should not be permitted without the permission of the local authority. Alteration of streambeds or bodies of water and adjacent vegetation should be permitted only as a means of erosion-control or flood control, as permitted by the adopted plans of regional or local jurisdictions, and in such a manner as to enhance water courses, scenic shorelines, and wetlands within the county.

East County Area Plan

The program area falls within Alameda County ECAP. The following goals and policies of the ECAP may be applicable to the proposed program and projects. Goals in the ECAP are intended to be general statements of a condition Alameda County wants to achieve, and the associated policies are the focused statements of how the County will achieve these goals (Alameda County 2000).

Sensitive Viewsheds

Goal: To preserve unique visual resources and protect sensitive viewsheds.

Policy 105: The County shall preserve the following major visually-sensitive ridgelines largely in open space use:

1. The ridgelines of Pleasanton, Main, and Sunol Ridges west of Pleasanton;
2. The ridgelines of Schafer, Shell, Skyline, Oak and Divide Ridges west of Dublin and the ridgelines above Doolan Canyon east of Dublin;
3. The ridgelines above Collier Canyon and Vasco Road and the ridgelines surrounding Brushy Peak north of Livermore;
4. The ridgelines above the vineyards south of Livermore;
5. The ridgelines above Happy Valley south of Pleasanton.

Policy 106: Structures may not be located on ridgelines or hilltops or where they will project above a ridgeline or hilltop as viewed from public roads, trails, parks and other public viewpoints unless there is no other site on the parcel for the structure or on a contiguous parcel in common ownership on or subsequent to the date this ordinance becomes effective. New parcels may not be created that have no building site other than a ridgeline or hilltop, or that would cause a structure to protrude above a ridgeline or hilltop, unless there is no other possible configuration.

Policy 107: The County shall permit no structure (e.g., housing unit, barn, or other building with four walls) that projects above a visually-sensitive major ridgeline**.**

Policy 108: To the extent possible, including by clustering if necessary, structures shall be located on that part of a parcel or on contiguous parcels in common ownership on or subsequent to the date this ordinance becomes effective, where the development is least visible to persons on public roads, trails, parks and other public viewpoints. This policy does not apply to agricultural structures to the extent it is necessary for agricultural purposes that they be located in more visible areas.

Policy 113: The County shall review development proposed adjacent to or near public parklands to ensure that views from parks and trails are maintained.

Policy 114: The County shall require the use of landscaping in both rural and urban areas to enhance the scenic quality of the area and to screen undesirable views. Choice of plants should be based on compatibility with surrounding vegetation, drought-tolerance, and suitability to site conditions; and in rural areas, habitat value and fire retardance.

Policy 115: In all cases appropriate building materials, landscaping and screening shall be required to minimize the visual impact of development. Development shall blend with and be subordinate to the environment and character of the area where located, so as to be as unobtrusive as possible and not detract from the natural, open space or visual qualities of the area. To the maximum extent practicable, all exterior lighting must be located, designed and shielded so as to confine direct rays to the parcel where the lighting is located.

Policy 116: To the maximum extent possible, development shall be located and designed to conform with rather than change natural landforms. The alteration of natural topography, vegetation, and other characteristics by grading, excavating, filling or other development activity shall be minimized. To the extent feasible, access roads shall be consolidated and located where they are least visible from public view points.

Policy 117: The County shall require that where grading is necessary, the off-site visibility of cut and fill slopes and drainage improvements is minimized. Graded slopes shall be designed to simulate natural contours and support vegetation to blend with surrounding undisturbed slopes.

Policy 118: The County shall require that grading avoid areas containing large stands of mature, healthy vegetation, scenic natural formations, or natural watercourses.

Policy 119: The County shall require that access roads be sited and designed to minimize grading.

Policy 120: The County shall require that utility lines be placed underground whenever feasible. When located above ground, utility lines and supporting structures shall be sited to minimize their visual impact.

Windfarms

Goal: To maximize the production of wind generated energy.

Policy 169: The County shall allow for continued operation, new development, redevelopment, and expansion of existing and planned windfarm facilities within the limits of environmental constraints.

Policy 170: The County shall protect nearby existing uses from potential traffic, noise, dust, visual, and other impacts generated by the construction and operation of windfarm facilities.

Streets and Highways

Goal: To complete County-planned street and highway improvements which are attractively designed to integrate pedestrian and vehicle use.

Policy 198: The County shall allow reductions in roadways widths in areas of complex topography, sensitive resources, or scenic value.

Scenic Highways

Goal: To preserve and enhance views within scenic corridors.

Policy 215: The County shall manage development and conservation of land within East County scenic highway corridors to maintain and enhance scenic values.

Contra Costa County—Conditions of Approval

Wind turbine structures shall be of neutral non-reflective colors. Colors shall be subject to review and approval by the Zoning Administrator. This includes the blades of the wind turbines. Although the program area is completely within Alameda County, its northern boundary borders Contra Costa County. Contra Costa County conditions of approval and ordinances related to wind energy conversion systems may be applicable to the cumulative analysis because the Vasco Winds Repowering Project is near the southern boundary of Contra Costa County.

Contra Costa County Code of Ordinances—Chapter 88-3: Wind Energy Conversion Systems (WECS)

88-3.618 Site Aesthetics. (a) WECS (towers and blades) structures and fencing shall be of a non-reflective, unobtrusive color. (b) All WECS, buildings, and structures shall be sited to minimize visual impact to residences within one mile, adjacent roadways, and County scenic routes. This may require relocation of one or more proposed WECS.

Environmental Setting

Regional Character

The program area is in an unincorporated rural part of Alameda County, in the northeastern corner of the county adjacent to the western boundary of San Joaquin County and the southern boundary of Contra Costa County.

The area's topography is characterized by grass-covered, rounded hills and smooth contours, with occasional steep slopes and ridges. A broad, flat expanse of the San Joaquin Valley lies to the northeast and east, and the Delta lies northeast of the site. The San Joaquin Valley is dominated by agricultural lands. The remainder of the surrounding area is characterized by grass-covered, rounded hills and smooth contours, with occasional steep slopes and ridges, and much of this land serves as cattle grazing land.

The Los Vaqueros watershed lies northwest of the program area. The city of Livermore lies west of the program area. To the north and east of the program area, respectively, are the city of Tracy and the community of Byron. The area south of the program area is largely undeveloped.

In general, the program area is mostly undeveloped. However, agricultural, industrial, and rural residential land uses are scattered throughout the region. Wind turbines and associated infrastructure, such as substations, are a dominant and established industrial visual feature throughout most of the region (Figures 2-3 and 3.1-1).

Vicinity Character

The project vicinity is defined as the area within 0.5 mile of the program area and is comprised of the program, Golden Hills Project, and Patterson Pass Project.

Program Area

The program area is in the northeastern corner of Alameda County next to its boundaries with Contra Costa County to the north and San Joaquin County to the east (Figure 1-2).

Similar to the greater region, the program area is mostly characterized by grass-covered, rolling hills, with road cuts to accommodate rural roads and I-580. Strings of turbines, power lines, transformers, access roads, and substations are the most visually distinct artificial features throughout most the program area. While portions of the program area are not developed with turbines, as noted in the Project Description, as of October 2011, there were approximately 3,490 wind turbines of 11 different types in the APWRA across both Alameda and Contra Costa Counties (Appendix A). These include the turbines associated with the Golden Hills and Patterson Pass Project sites. The program area is dotted with industrial sites, residences, and stock ponds, including a few clusters of smaller rural residential properties on Dyer Road, Midway Road, and Mountain House Road.

The program area north of I-580 is primarily composed of rolling terrain that transitions to flatter agricultural lands just outside of the northeastern program area boundary. The California Aqueduct, California Aqueduct Bikeway, Bethany Reservoir State Recreation Area (Bethany Reservoir), Altamont and Vasco Road Landfills, Summit School, Mountain House Bar, Mountain House School, and a series of multi-use regional trails connecting Brushy Peak Regional Preserve to Del Valle Regional Park, San Joaquin County border to Shadow Cliffs Regional Recreation Area, Brushy Peak

Regional Preserve to Bethany Reservoir, and Vasco Caves Regional Preserve to Brushy Peak Regional Preserve are in the northern program area (Figure 3.1-2) (East Bay Regional Park District 2007). There are also a couple of industrial sites and railroad tracks in this area as well.

The program area south of I-580 is more sparsely populated and has fewer industrial uses than the northern program area. The terrain transitions from rolling, grassy hills to more rugged, steeper relief with more trees to the south. The potential future Tesla Regional Preserve and Carnegie State Vehicular Recreation Area are in the southern program area (Figure 3.1-2). The Midway Substation is another visually prominent feature in this section of the program area (Figure 2-10).

The rolling terrain and presence of turbines creates a unique visual experience for viewers on scenic routes shown in Figure 3.1-2 and from non-designated roadways in the program area. Views vary, seasonally, when the grasses on the hillsides change from green to brown.

Golden Hills Project

The visual character of the Golden Hills project area is similar to that of the program area. The character of the Golden Hills project area (Figure 3.1-2) is discussed from north to south.

The northernmost portion of the project area, just south of I-580, is characterized by rolling, grassy terrain with turbines, transmission lines, and access roads. In addition to the turbines, this area is dotted with industrial facilities, residences, and stock ponds. The area is also characterized by steep cuts in the hills throughout to accommodate Jess Ranch Road, Flynn Road, and the railroad tracks. The San Joaquin County to Shadow Cliffs Regional Recreation Area regional trail follows a portion of the northern project area boundary (East Bay Regional Park District 2007). There are four scenic routes in the project area vicinity: I-580 is both a state- and County-designated scenic route, and Altamont Pass Road, Flynn Road, and Patterson Pass Road are County-designated scenic routes (Figure 3.1-2) (Alameda County 1966). Grant Line Road is more than a mile northeast of the closest project boundary, while Mountain House Road is more than 2 miles northeast of the closest project boundary, and neither have views of the project area due to intervening topography. In addition, the proposed Route 239 freeway (a proposed Alameda County-designated scenic route) would be least 2 miles northeast of the closest project boundary (TriLink 2014). The proposed Route 239 freeway is not shown on Figure 3.1-2 because the final route has not been chosen. However, it is anticipated that this route, which would be near Grant Line and Mountain House Roads, would similarly not have views of the project area due to intervening topography.

Flynn Road crosses the southernmost portion of the project area from west to east where no turbines are currently present. Views consist mostly of rolling grass-covered hills. However, strings of turbines in the vicinity of this undeveloped area are still the most prominent artificial features in views from this section of road. Patterson Pass Road, an Alameda County–designated scenic route, runs generally south of the project area, skirting its eastern tip (Figure 3.1-2) (Alameda County 1966). Views of the project area are available from Livermore, I-580, Flynn Road, Jess Ranch Road, eastern Patterson Pass Road between its intersection with the railroad tracks and the San Joaquin County line, and various residential (Figure 1-2) and industrial uses. Hills block views of the project area from Altamont Pass Road. Because the existing turbines are located on hill- and ridgetops, they are visible from these land uses. Refer to Figure 3.1-1 for a representative view from I-580.

The Golden Hills project area displays a moderate level of vividness, intactness, and unity. The rolling hills are visually pleasing in contrast to the flat valley floor. The turbines may be perceived as adding to the visual uniqueness of views because of the form and motion associated with the turbines. However, they can also be perceived as a negative visual feature due to the scale and number of turbines that populate the rolling hillsides and can be seen as jutting out of the tops of the smooth, grass-covered, rolling hills, detracting from, encroaching on, and breaking up views of these natural features. Utility lines and pylon towers in the program area may act to detract from the intactness and unity, but vary in prominence from place to place. Therefore, the overall visual quality of the Golden Hills project area is moderate.

Patterson Pass Project

Like the program area, the Patterson Pass Project vicinity is characterized by grassy, rolling hills with strings of turbines, transmission lines, substations, and access roads. There are currently 317 operational turbines on the Patterson Pass Project site. In addition to the turbines, there are two industrial sites, a stream, and four stock ponds in the Patterson Pass Project vicinity.

There are no state-designated scenic highways in the Patterson Pass Project vicinity. Patterson Pass Road, along the southern border of the site, is an Alameda County–designated scenic route (Figure 3.1-2) (Alameda County 1966).

Views of this project site are available from Patterson Pass Road looking north and from Jess Ranch Road looking south. There are also a couple of residences near the project area; however, the closest is at least 2,200 feet from the nearest proposed turbine location. The dominant features visible from these roads are the existing turbine strings covering the project area.

Like the Golden Hills project area, the Patterson Pass project area displays a moderate level of vividness, intactness, and unity. The rolling hills are visually pleasing in contrast to the flat valley floor. The turbines may be perceived as adding to the visual uniqueness of views because of the form and motion associated with the turbines. However, they can also be perceived as a negative visual feature due to the scale and number of turbines that populate the rolling hillsides and can be seen as jutting out of the tops of the smooth, grass-covered, rolling hills that detract from, encroach on, and break up views of these natural features. Utility lines and pylon towers in the program area may detract from the intactness and unity, but to varying degrees, depending on location. Therefore, the overall visual quality of the Patterson Pass Project is moderate.

Existing Viewer Groups and Viewer Responses

The following discussion of existing viewer groups and viewer responses is applicable to the program, Golden Hills Project, and Patterson Pass Project.

Residents

Residences are scattered throughout the program area. These residences tend to be mostly single-family, rural homes on large land parcels. The views of most residents in the program area consist of smooth, grass-covered, rolling hills and turbine strings characteristic of the program area. Residents would be expected to have the highest sensitivity to visual changes in the project areas because of their familiarity with the view, their investment in the area, and their sense of ownership of the view. Residents who occupy parcels leased for wind generation facilities would be expected to have the lowest level of sensitivity to change because these landowners have agreed to lease the site for wind energy generation purposes and would therefore be more accepting of related visual changes.

Businesses

There are a few businesses/industrial uses scattered throughout the program area. However, almost all business and industrial uses are located north of I-580. Businesses in the program area are mostly agriculture-related. There is an off-road specialty store and the Altamont Landfill off of Altamont Pass Road, the Vasco Road Landfill off of Vasco Road, the Mountain House Bar off of Grant Line Road, and a construction company off of Dyer Road. Almost all businesses in the program area have turbines in their viewshed, and their views consist of smooth, grass-covered, rolling hills and turbine strings characteristic of the program area. Employees at nearby businesses would be engaged in work-related activities and would be expected to be less sensitive to visual changes than nearby residents. Therefore, businesses are considered to have low visual sensitivity.

Roadway Users

Motorists use roadways in the program and project areas and may use the roadways for commuting and hauling or for more recreational uses, such as sightseeing on scenic roadways. Roadways traversing the project range from high-speed interstate to lower-speed, two-lane local roadways that wind through the rolling landscape. Motorists' views range from smooth, grass-covered, rolling hills dominated with turbine strings to steep ridges and ravines with no artificial structures. While more numerous than residents, motorists would generally be less sensitive to visual changes in the program area because of the shorter duration of their exposure to the views and the focus of their attention on driving activities. Therefore, motorists are considered to have moderate visual sensitivity.

Recreationists

Recreationists include cyclists on regional trails and local roadways and users of recreational and preserve areas. Viewers using recreation trails, recreation areas, and regional preserves are considered to have high visual sensitivity because recreationists tend to highly value views in designated recreation areas and could be exposed to these views for extended periods (e.g., hiking along regional trails or spending the day at Bethany Reservoir).

3.1.3 Environmental Impacts

Methods for Analysis

Using the concepts and terminology described at the beginning of this section, and criteria for determining significance described below, analysis of the visual effects of the project are based on the following.

- Direct field observation on June 5, 2013 from vantage points, including neighboring properties and roadways.
- Photographic documentation of key views of and from the project sites.
- Evaluation of the regional visual context.
- Visual simulations.
- Review of the project in regard to compliance with state and local ordinances and regulations and local general plan policies.
- Professional standards pertaining to visual quality.

Determination of Significance

In accordance with Appendix G of the State CEQA Guidelines, the program Alternative 1, program Alternative 2, the Golden Hills project, or the Patterson Pass project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Have a substantial adverse effect on a scenic vista.
- Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings along a scenic highway.
- Substantially degrade the existing visual character or quality of the site and its surroundings.
- Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.

Impacts and Mitigation Measures

This section describes the potential impacts related to aesthetics that could result from implementation of the proposed program and projects. The analysis begins with relatively short-term effects anticipated during construction and proceeds to consideration of the longer term visual impacts.

Impact AES-1a-1: Temporary visual impacts caused by construction activities—program Alternative 1: 417 MW (less than significant with mitigation)

Construction associated with Alternative 1 would create temporary changes in views of and from the program area. Construction is expected to last 8–12 months, and construction activities would create views of heavy equipment and associated vehicles (see Section 2.6.3, *Repowering Activities*), into the viewshed of residents, businesses, recreation areas, state-designated scenic highways (I-580), and Alameda County–designated scenic routes. Construction would also require crane pads, laydown areas for offloading turbine components, and three to eight concrete batch plants. Refer to the *Vicinity Character* discussion above for a detailed description of these land uses in the program area.

Motorists along state-designated scenic highways and County-designated scenic routes, nearby residences, recreationists using the recreation areas and trails, and employees of nearby businesses would be the principal viewer groups. While motorists in the area would be moderately sensitive to changes in views, they have intermittent and short-term visual access to the program area as they are passing by, so they would not be negatively affected by temporary construction activities. Residents are considered highly sensitive viewers and could be adversely affected by construction activities because they would have prolonged views of construction activities and are not accustomed to construction activities in the area. Recreationists are also considered highly sensitive to views of construction activity because they could have prolonged views when using regional trails or spending the day at Bethany Reservoir, they value the views from these recreation areas, and they would not be accustomed to construction activities in the area. Employees of businesses would not be greatly affected by construction activities because they would be mostly focused on their work rather than construction activities.

In addition, high-voltage lighting used for nighttime construction would negatively affect nighttime views of and from the work area and could be a nuisance to nearby residents, who are considered to have high visual sensitivity. Construction is assumed to operate for approximately 10 hours per day.

Alameda County Noise Ordinance, Section 6.60.070, limits noise sources associated with construction to occur between 7 a.m. and 7 p.m. Monday through Friday and between 8 a.m. and 5 p.m. on Saturday and Sunday. This would ensure that most construction would not occur past these hours. During summer, the ordinance will ensure that nighttime lighting is not needed because the sun will rise around 6 a.m. and set around 8:30 p.m. However, during winter, the sun will rise around 7 a.m. and set around 5 p.m. (Sunrise Sunset 2013). Consequently, if construction occurs after sunset, which varies by season, high-powered lighting would be required for construction operations. The presence of this lighting during construction would adversely affect nearby residents if high-powered lighting spills inside their homes or yards; roadway travelers passing by construction work areas near roadways in the program area during dawn and dusk would have similar experiences. High-powered lighting could also adversely affects views of sunsets and nighttime constellations for viewers in the program area during the construction months.

Construction impacts would be temporary and short-term, and decommissioning and construction activities would occur in a manner consistent with Alameda County requirements for work days and hours. However, the highly sensitive viewers in the program area (residents and recreationists) could perceive these impacts as significant. Therefore, construction impacts would be potentially significant on a temporary basis. Implementation of Mitigation Measure AES-1 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-1: Limit construction to daylight hours

Major construction activities will not be undertaken between sunset and sunrise or on weekends. Construction activity is specifically prohibited from using high-wattage lighting sources to illuminate work sites after sunset and before sunrise, with the exception of nighttime deliveries under the approved transportation control plan or other construction activities that require nighttime work for safety considerations.

Impact AES-1a-2: Temporary visual impacts caused by construction activities—program Alternative 2: 450 MW (less than significant with mitigation)

Impacts associated with Alternative 2 would be similar to those of Alternative 1. Under Alternative 2, 21 more turbines could be installed, resulting in a slightly greater amount of construction activity. However, construction of the additional turbines would occur in close proximity to the turbines proposed under Alternative 1 and would not result in perceivable differences in construction between the two alternatives.

Construction associated with Alternative 2 would create temporary changes in views of and from the program area. Construction is expected to last 8–12 months, and construction activities would create views of heavy equipment and associated vehicles (see Section 2.6.3, *Repowering Activities*), into the viewshed of residents, businesses, recreation areas, state-designated scenic highways (I-580), and Alameda County–designated scenic routes. Refer to the *Vicinity Character* discussion above for a detailed description of these land uses in the program area. In addition, high-voltage lighting used for nighttime construction would negatively affect nighttime views of and from the work area and could be a nuisance to nearby residents, who are considered to have high visual sensitivity. Construction is assumed to operate for approximately 10 hours per day. Alameda County Noise Ordinance, Section 6.60.070, limits noise sources associated with construction to occur between 7 a.m. and 7 p.m. Monday through Friday and between 8 a.m. and 5 p.m. on Saturday and Sunday. This would ensure that most construction would not occur past these hours. During summer, the ordinance will ensure that nighttime lighting is not needed because the sun will rise around 6 a.m. and set around 8:30 p.m. However, during winter, the sun will rise around 7 a.m. and set around 5 p.m. (Sunrise Sunset 2013). Consequently, if construction occurs after sunset, which varies by season, high-powered lighting would be required for construction operations. The presence of this lighting during construction would adversely affect nearby residents if high-powered lighting spills inside their homes or yards; roadway travelers passing by construction work areas near roadways in the program area during dawn and dusk would have similar experiences. High-powered lighting could also adversely affects views of sunsets and nighttime constellations for viewers in the program area during the construction months.

Motorists along State scenic highways and County-designated scenic routes, nearby residences, recreationists using the recreation areas and trails, and employees of nearby businesses would be the principal viewer groups. While motorists in the area would be moderately sensitive to changes in views, they have intermittent and short-term visual access to the program area as they are passing by, so they would not be negatively affected by temporary construction activities. Residents are considered highly sensitive viewers and could be adversely affected by construction activities because they would have prolonged views of construction activities and are not accustomed to construction activities in the area. Recreationists are also considered highly sensitive to views of construction activity because they could have prolonged views when using regional trails or spending the day at the Bethany Reservoir, and they value the views from these recreation areas and would not be accustomed to construction activities in the area. Employees of businesses would not be greatly affected by construction activities because they would be mostly focused on their work, rather than construction activities.

Construction impacts would be temporary and short-term, and decommissioning and construction activities would occur in a manner consistent with Alameda County requirements for work days and hours. However, the highly sensitive viewers in the program area (residents and recreationists) could perceive these impacts as significant.

Therefore, construction impacts would be potentially significant on a temporary basis. Implementation of Mitigation Measure AES-1 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-1: Limit construction to daylight hours

Impact AES-1b: Temporary visual impacts caused by construction activities—Golden Hills Project (less than significant with mitigation)

Construction of the Golden Hills Project is expected to last approximately 9 months. Refer to the discussion of the program alternatives (Impacts AES-1a-1 and AES-1a-2) for a general description of visual impacts of construction activities. Temporary construction impacts for the Golden Hills Project would be similar, and highly sensitive viewers in the Golden Hills Project area (residents and recreationists) could be adversely affected by construction activities. This impact would be potentially significant. Implementation of Mitigation Measure AES-1 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-1: Limit construction to daylight hours

Impact AES-1c: Temporary visual impacts caused by construction activities—Patterson Pass Project (less than significant with mitigation)

Construction of the Patterson Pass Project is expected to last approximately 6–9 months. Refer to the discussion for the program alternatives (Impacts AES-1a-1 and AES-1a-2) for a general description of visual impacts of construction activities. Temporary construction impacts for the Patterson Pass Project would be similar, and highly sensitive viewers in the Patterson Pass Project area (residents and recreationists) could be adversely affected by construction activities. This impact would be potentially significant. Implementation of Mitigation Measure AES-1 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-1: Limit construction to daylight hours

Impact AES-2a-1: Have a substantial adverse effect on a scenic vista—program Alternative 1: 417 MW (less than significant with mitigation)

As discussed in the *Regulatory Setting*, Policy 105 of the ECAP lists the ridgelines above Vasco Road and the ridgelines surrounding Brushy Peak north of Livermore as sensitive viewsheds. Policy 105 also states that the County shall preserve these visually sensitive ridgelines largely in open space use. Since the project area surrounds Brushy Peak, and Vasco Road passes through the northwestern boundary of the project area (Figure 3.1-2), there is potential for turbines to be installed in these areas. However, under Policy 105 the County would be obligated to disallow new turbine structures from being located in these areas (see *Regulatory Setting* section). The installation of new turbines in such areas would conflict with Policy 105 and would constitute a significant impact on scenic routes identified in the Scenic Route Element.

A number of scenic vistas are available from local roadways, out and over the program area. In addition, scenic vistas exist from local recreational trails and residences and businesses on hillsides in the program area. These areas consist of wide open views of the rolling, grass-covered, rural landscape dotted with existing turbines. The hub height of first- and second-generation turbines ranges from 18 to 55 meters (approximately 59 to 180 feet) and third-generation range from 41 to 68 meters (approximately 134 to 223 feet). The proposed fourth-generation towers installed under Alternative 1 would be 80–96 meters (262–315 feet) tall. Therefore, the proposed fourth-generation towers would be 28–62 meters (92–203 feet) taller than the existing turbines. Views of the proposed turbines may be more or less prevalent depending on a viewer's location within the landscape and if the viewer has more direct views of the turbines or views that are partially or fully screened by topography.

Although the new, more efficient turbines are larger than the existing turbines, the new widely spaced configuration detracts less from the natural landscape than the existing string configuration. Figures 3.1-3 to 3.1-7 show existing views of the program area and simulated views with buildout of the program under both alternatives. The images are presented from north to south; Figures 3.1-6 and 3.1-7 are examples of a scenic vista in the program area. The new, less-cluttered configuration allows for views of the rolling, grassy terrain to become more prominent, back-dropped against the sky, and less interrupted by anthropogenic features. While the larger turbines would draw viewers' attention toward them, the eye is also able to follow the ridgeline of the hills in a more cohesive manner than existing conditions. With existing conditions, the eye is drawn to and focused on the numerous turbines that clutter the view by sticking up and across the hillsides and ridgelines.

Placement of new turbines on undeveloped portions of the program area would introduce large structures where none presently exist, altering the undeveloped character of these parcels.

There are also scenic vistas from Tesla Road, which is an Alameda County–designated scenic route near the southern boundary of the program area where no turbines currently exist. These views consist of grass-covered, rolling hills dotted with oak trees; steeper ridges; and crevasses and are mostly free from encroachment of artificial features, except for the occasional residence. Installing turbines in these scenic vista areas would constitute a significant impact on views from local roadways (including Tesla Road), recreational trails, and residences and businesses located on hillsides. Policies 170 and 215 of the East County Area Plan require the County, respectively, to protect nearby existing uses from the visual impacts (among other effects) of windfarms' construction and operation, and to maintain and enhance scenic values in these areas through review of development and use of conservation policies (see *Regulatory Setting*). Because it is an area where no turbines currently exist, the conflict with Policies 170 and 215 and the visual impact itself would be significant. For those areas with existing older turbines, the replacement of the many existing smaller and older turbines with proportionally far fewer and less intrusive fourth-generation turbines would serve Policies 170 and 215 of the East County Area Plan, and serve to protect and enhance scenic values.

Therefore, this impact would be potentially significant. Implementation of Mitigation Measures AES-2a through AES-2c would reduce this impact to a less-than-significant level.

Mitigation Measure AES-2a: Require site development review

New turbines along ridgelines or hilltops that have not previously been developed with commercial-scale wind turbines will not be allowed, unless a separate Site Development Review is completed that determines that the visual effects will be substantially avoided by distance from public view points (e.g., more than 2,000 feet), intervening terrain, screening landscaping, or compensatory improvements to equivalent and nearby (radius of 1 mile) scenic features, as approved by the Planning Director.

Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

Project sites will be cleaned of all derelict equipment, wind turbine components not required for the project, and litter and debris from old turbines and past turbine operations. Such litter and debris may include derelict turbines, obsolete anemometers, unused electrical poles, and broken turbine blades. In addition, abandoned roads that are no longer in use on such parcels will be restored and hydroseeded to reclaim the sites and remove their visual traces from the viewscape, except in cases where the resource agencies (USFWS and CDFW) recommend that the features be left in place for resource protection. All parcels with new turbines will be maintained in such a manner through the life of project operations and until the parcels are reclaimed in accordance with the approved reclamation plan.

Mitigation Measure AES-2c: Screen surplus parts and materials

Surplus parts and materials that are kept onsite will be maintained in a neat and orderly fashion and screened from view. This can be accomplished by using a weatherproof camouflage material that can be draped over surplus parts and materials stockpiles. Draping materials will be changed out to accommodate for seasonal variations so that surplus materials are camouflaged in an effective manner when grasses are both green and brown.

Impact AES-2a-2: Have a substantial adverse effect on a scenic vista—program Alternative 2: 450 MW (less than significant with mitigation)

As discussed in the *Regulatory Setting*, Policy 105 of the ECAP lists the ridgelines above Vasco Road and the ridgelines surrounding Brushy Peak north of Livermore as sensitive viewsheds. Policy 105 also states that the County shall preserve these visually-sensitive ridgelines largely in open space use. Since the project area surrounds Brushy Peak, and Vasco Road passes through the northwestern boundary of the project area (Figure 3.1-2), there is potential for turbines to be installed in these areas. However, under Policy 105 the County would be obligated to disallow new turbine structures from being located in these areas (see *Regulatory Setting* section).

A number of scenic vistas are available from local roadways, out and over the program area. In addition, scenic vistas exist from local recreational trails and residents and businesses located on hillsides within the program area. These areas consist of wide open views of the rolling, grass-covered, rural landscape dotted with existing turbines. The hub height of first- and second-generation turbines ranges from 18 to 55 meters (approximately 59 to 180 feet) and third-generation range from 41–68 meters (approximately 134–223 feet). The proposed fourth-generation towers installed under Alternative 1 would be 80–96 meters (262–315 feet) tall. Therefore, the proposed fourth-generation towers would be 28–62 meters (92–203 feet) taller than the existing turbines located onsite. Views of the proposed turbines may be more or less prevalent depending on a viewer's location within the landscape and if the viewer has more direct views of the turbines or views that are partially or fully screened by topography.

Although the new, more efficient turbines are larger than the existing turbines, the new widely spaced configuration detracts less from the natural landscape than the existing string configuration. Figures 3.1-3 to 3.1-7 show existing views of the program area and simulated views with buildout of the program Alternative 2. The images are presented from north to south, and the existing view shown in Figures 3.1-6 and 3.1-7 show examples of scenic vistas in the program area. Twenty-one additional turbines would be built under Alternative 2. As seen in the simulation for this alternative, only the tops of the turbines and turbine blades of these new turbines would be visible, given the hilly terrain that acts to obscure the rest of the turbine body from view. The additional turbines associated with Alternative 2 are barely noticeable and would result in visual changes that are imperceptible compared with Alternative 1. Like Alternative 1, the new, less-cluttered configuration of Alternative 2 allows for views of the rolling, grassy terrain to become more prominent, back-dropped against the sky, and less interrupted by anthropogenic features. While the larger turbines would draw viewers' attention toward them, the eye is also able to follow the ridgeline of the hills in a more cohesive manner than existing conditions. With existing conditions, the eye is drawn to and focused on the numerous turbines that clutter the view by sticking up and across the hillsides and ridgelines.

There are also scenic vistas from Tesla Road, which is an Alameda County–designated scenic route near the southern boundary of the program area where no turbines currently exist. These views consist of grass-covered, rolling hills dotted with oak trees; steeper ridges; and crevasses and are mostly free from encroachment of artificial features, except for the occasional residence. Installing turbines in these scenic vista areas would be a significant impact on views from local roadways (including Tesla Road), recreational trails, and residences and businesses located on hillsides. Policies 170 and 215 of the ECAP require the County, respectively, to protect nearby existing uses from the visual impacts (among other effects) of windfarms' construction and operation, and to maintain and enhance scenic values in these areas through review of development and use of conservation policies (see *Regulatory Setting* section). Because it is an area where no turbines currently exist, the conflict with Policies 170 and 215 and the visual impact itself would be significant. For those areas with existing older turbines, the replacement of the many existing smaller and older turbines with proportionally far fewer and less intrusive fourth-generation turbines would serve Policies 170 and 215 of the East County Area Plan, and serve to protect and enhance scenic values.

Therefore, this impact would be potentially significant. Implementation of Mitigation Measures AES-2a, 2b, and 2c would reduce this impact to a less-than-significant level.

Mitigation Measure AES-2a: Require site development review

Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

Mitigation Measure AES-2c: Screen surplus parts and materials

Impact AES-2b: Have a substantial adverse effect on a scenic vista—Golden Hills Project (less than significant)

There are no designated scenic vistas in the Golden Hill Project area. However, there are a number of scenic vistas available from local roadways in the Golden Hills Project area, such as Patterson Pass Road (Figure 3.1-6), Altamont Pass Road (Figure 3.1-7), Flynn Road, and I-580, out and over the project site. In addition, scenic vistas exist from local recreational trails and, potentially, from nearby residences and businesses located on hillsides could have vista views that include the Golden Hills Project site. These areas consist of wide open views of the rolling, grass-covered, rural landscape dotted with existing turbines. The hub heights of first- and second-generation turbines in the project area range from 18 to 55 meters (approximately 59 to 180 feet). The proposed fourth-generation towers installed would be 80–96 meters (262–315 feet) tall. Therefore, the proposed fourth-generation towers would be 41–62 meters (135–203 feet) taller than the existing turbines. Views of the proposed turbines may be more or less prevalent depending on a viewer's location within the landscape and whether the viewer has more direct views of the turbines or views that are partially or fully screened by topography.

Although the new, more efficient turbines are larger than the existing turbines, the new widely spaced configuration detracts less from the natural landscape than the existing string configuration (Figures 3.1-3 to 3.1-7). The new, less-cluttered configuration allows for views of the rolling, grassy terrain to become more prominent, back-dropped against the sky, and less interrupted by anthropogenic features. While the larger turbines would draw viewers' attention toward them, the eye is also able to follow the ridgeline of the hills in a more cohesive manner than existing conditions. With existing conditions, the eye is drawn to and focused on the numerous turbines that clutter the view by sticking up and across the hillsides and ridgelines.

Because the new turbines would detract less from the natural landscape than the existing string configuration, this impact would be less than significant. With respect to Policies 170 and 215 of the ECAP, the replacement of the many existing smaller and older turbines with proportionally far fewer fourth-generation turbines with broader spacing would serve these policies and help to protect and enhance scenic values.

Impact AES-2c: Have a substantial adverse effect on a scenic vista—Patterson Pass Project (less than significant)

There are no designated scenic vistas in the Patterson Pass Project area. However, there are a number of scenic vistas available from local roadways in the Patterson Pass Project area, such as those from Patterson Pass Road (Figure 3.1-6), out and over the project site. In addition, scenic vistas exist from local recreational trails and, potentially, from nearby residences and businesses located on hillsides could have vista views that include the Patterson Pass Project site. These areas consist of wide open views of the rolling, grass-covered, rural landscape dotted with existing turbines. The hub heights of first- and second-generation turbines located on the site range from 18 to 55 meters (approximately 59 to 180 feet). The proposed fourth-generation towers installed would be 80–96 meters (262–315 feet) tall. Therefore, the proposed fourth-generation towers would be 41–62 meters (135–203 feet) taller than the existing turbines located onsite. Views of the proposed turbines may be more or less prevalent depending on a viewer's location within the landscape and whether the viewer has more direct views of the turbines or views that are partially or fully screened by topography.

Although the new, more efficient turbines are larger than the existing turbines, the new widely spaced configuration detracts less from the natural landscape than the existing string configuration (Figures 3.1-3 to 3.1-7). The new, less-cluttered configuration allows for views of the rolling, grassy terrain to become more prominent, back-dropped against the sky, and less interrupted by anthropogenic features. While the larger turbines would draw viewers' attention toward them, the eye is also able to follow the ridgeline of the hills in a more cohesive manner than existing conditions. With existing conditions, the eye is drawn to and focused on the numerous turbines that clutter the view by sticking up and across the hillsides and ridgelines.

Because the new turbines would detract less from the natural landscape than the existing string configuration, this impact would be less than significant. With respect to Policies 170 and 215 of the ECAP, the replacement of the many existing smaller and older turbines with proportionally far fewer fourth-generation turbines with broader spacing would serve these policies and help to protect and enhance scenic values.

Impact AES-3a-1: Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings along a scenic highway—program Alternative 1: 417 MW (less than significant with mitigation)

As discussed in the *Vicinity Character* section, I-580 from the San Joaquin County line to SR 205, a 0.4-mile-long segment, is a state-designated scenic highway (California Department of Transportation 2012). As shown in Figure 3.1-2, the program area includes this segment of I-580. The closest existing turbines to this segment are approximately 0.7 mile south and are not easily visible from I-580 due to topography in some areas and distance-only in others. The most dominant artificial features are the large towers associated with power lines and the tall, stadium-type lighting associated with the former Altamont Speedway. Because the location of turbines has not yet been determined, it is possible that wind turbines could be installed in this area. Although motorists are considered moderately sensitive, it would be a significant impact to locate turbines around this designated scenic highway where no turbines currently exist.

In addition to state-designated scenic highways, there are several County-designated scenic routes in the program area. Refer to the *Vicinity Character* discussion for the program for a list of County-designated scenic routes in the program area. Currently, there are no turbines in the program area around Byron-Bethany Road, Grant Line Road, Tesla Road, and Vasco Road. There are also portions of I-580, Altamont Pass Road, Flynn Road, Mountain House Road, Patterson Pass Road, and the proposed Route 239 Freeway (Figure 3.1-2) where no turbines currently exist, but motorists on these roads are accustomed to seeing wind turbines along the route, so they would not be adversely affected. Additionally, where there are existing turbines, although the new, more efficient turbines would be 28–62 meters (92–203 feet) taller than the existing turbines, the new widely spaced configuration detracts less from the natural landscape than the existing string configuration (Figures 3.1-3 to 3.1-7). The proposed configuration allows for views of the rolling, grassy terrain to become more prominent, back-dropped against the sky, and less interrupted by anthropogenic features. While the larger turbines would draw viewers' attention toward them, the eye is also able to follow the ridgeline of the hills in a more cohesive manner than existing conditions. With existing conditions, the eye is drawn to and focused on the numerous turbines that clutter the view by sticking up and across the hillsides and ridgelines. However, it would be a significant impact to locate turbines around Byron-Bethany Road, Grant Line Road, Tesla Road, and Vasco Road where no turbines currently exist even though motorists are considered moderately but not highly sensitive.

For such areas where no turbines currently exist, such as the western portion of Flynn Road, the effect on the scenic resources and the visual impact itself would be significant. For those areas with existing older turbines, the replacement of the many existing smaller and older turbines with proportionally far fewer and less intrusive fourth-generation turbines would serve Policies 170 and 215 of the East County Area Plan, and serve to protect and enhance scenic values. Therefore, this impact is potentially significant. Implementation of Mitigation Measures AES-2a, AES-2b, AES-2c, and AES-3 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-2a: Require site development review

Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

Mitigation Measure AES-2c: Screen surplus parts and materials

Mitigation Measure AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road

In order to comply with Policy 170 of Alameda County's *East County Area Plan*, and to prevent significant impacts on visual character, no turbines will be located on the undeveloped portion of the Golden Hills project area along Flynn Road (Figure 3.1-2).

Impact AES-3a-2: Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings along a scenic highway—program Alternative 2: 450 MW (less than significant with mitigation)

As discussed in the *Vicinity Character* section, I-580 from the San Joaquin County line to SR 205, a 0.4-mile-long segment, is a state-designated scenic highway (California Department of Transportation 2012). As shown in Figure 3.1-2, the program area includes this segment of I-580. The closest existing turbines to this segment are approximately 0.7 mile south and are not easily visible from I-580 due to topography in some areas and distance-only in others. The most dominant artificial features are the large towers associated with power lines and the tall, stadium-type lighting associated with the former Altamont Speedway. Because the location of turbines has not yet been determined, it is possible that wind turbines could be installed in this area. Although motorists are considered moderately sensitive, it would be a significant impact to locate turbines around this designated scenic highway where no turbines currently exist.

In addition to state-designated scenic highways, there are several County-designated scenic routes in the program area. Refer to the *Vicinity Character* discussion for the program for a list of County-designated scenic routes in the program area. Currently, there are no turbines in the program area around Byron-Bethany Road, Grant Line Road, Tesla Road, and Vasco Road. There are also portions of I-580, Altamont Pass Road, Flynn Road, Mountain House Road, Patterson Pass Road, and the proposed Route 239 Freeway (Figure 3.1-2) where no turbines currently exist, but motorists on these roads are accustomed to seeing wind turbines along the route, so they would not be adversely affected. Additionally, where there are existing turbines, although the new, more efficient turbines would be 28–62 meters (92–203 feet) taller than the existing turbines, the new spaced out configuration detracts less from the natural landscape than the existing string configuration (Figures 3.1-3 to 3.1-7). As seen in the simulations for this alternative, only the tops of the turbines and turbine blades of these new turbines would be visible, if visible at all, given the hilly terrain that acts to obscure the rest of the turbine body from view. The additional turbines associated with Alternative 2 are barely noticeable and would result in visual changes that are unperceivable compared to Alternative 1. Like Alternative 1, the proposed configuration of Alternative 2 allows for views of the rolling, grassy terrain to become more prominent, back-dropped against the sky, and less interrupted by anthropogenic features. While the larger turbines would draw viewers' attention toward them, the eye is also able to follow the ridgeline of the hills in a more cohesive manner than existing conditions. With existing conditions, the eye is drawn to and focused on the numerous turbines that clutter the view by sticking up and across the hillsides and ridgelines. However, it would be a significant impact to locate turbines around Byron-Bethany Road, Grant Line Road, Tesla Road, and Vasco Road where no turbines currently exist even though motorists are considered moderately but not highly sensitive.

For such areas where no turbines currently exist, the effect on the scenic resources and the visual impact itself would be significant. For those areas with existing older turbines, the replacement of the many existing smaller and older turbines with proportionally far fewer and less intrusive fourth-generation turbines would serve Policies 170 and 215 of the East County Area Plan, and serve to protect and enhance scenic values. Therefore, this impact is potentially significant. Implementation of Mitigation Measures AES-2a, AES-2b, and AES-2c would reduce this impact to a less-than-significant level.

Mitigation Measure AES-2a: Require site development review

Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

Mitigation Measure AES-2c: Screen surplus parts and materials

Mitigation Measure AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road

Impact AES-3b: Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings along a scenic highway—Golden Hills Project (less than significant with mitigation)

There are no state-designated scenic highways in the Golden Hills Project area. Grant Line and Mountain House Roads are more than 1 and 2 miles, respectively, northeast of the closest project boundary and do not have views of the site due to intervening topography. In addition, the proposed Route 239 freeway would be at least 2 miles northeast of the closest project boundary, and it is anticipated that this proposed route would similarly not have views of the project area due to intervening topography. However, there are four County-designated scenic routes in the area: I-580, Altamont Pass Road, Flynn Road, and Patterson Pass Road (Figure 3.1-2). These routes are already lined with existing turbines, so motorists on these routes are accustomed to views of turbines, and although the new, more efficient turbines would be 41–62 meters (135–203 feet) taller than the existing turbines, the new widely spaced configuration detracts less from the natural landscape than the existing thread configuration (Figures 3.1-3 to 3.1-7). The proposed configuration allows for views of the rolling, grassy terrain to become more prominent, back-dropped against the sky, and less interrupted by anthropogenic features. While the larger turbines would draw viewers' attention toward them, the eye is also able to follow the ridgeline of the hills in a more cohesive manner than existing conditions. With existing conditions, the eye is drawn to and focused on the numerous turbines that clutter the view by sticking up and across the hillsides and ridgelines.

For areas where no turbines currently exist, such as along portions of Flynn Road, the effect on the scenic resources and the visual impact itself would be significant. For those areas with existing older turbines, the replacement of the many existing smaller and older turbines with proportionally far fewer and less intrusive fourth-generation turbines would serve Policies 170 and 215 of the ECAP, and serve to protect and enhance scenic values. This impact would be potentially significant. Implementation of Mitigation Measures AES-2a, AES-2b, and AES-2c would reduce this impact to a less-than-significant level.

Mitigation Measure AES-2a: Require site development review

Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

Mitigation Measure AES-2c: Screen surplus parts and materials

Mitigation Measure AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road

Impact AES-3c: Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings along a scenic highway—Patterson Pass Project (less than significant)

There are no state-designated scenic highways in the Patterson Project area. However, there is one County-designated scenic route in the area: Patterson Pass Road (Figure 3.1-2). Patterson Pass is already lined with existing turbines, so motorists on this route are accustomed to views of turbines, and as discussed for Impact AES-3b above, the new turbines are less visually obtrusive (Figure 3.1-6). This configuration allows for views of the rolling, grassy terrain to become more prominent, back-dropped against the sky, and less interrupted by anthropogenic features. While the 41–62 meters (135–203 feet) taller turbines would draw viewers' attention toward them, the eye is also able to follow the ridgeline of the hills in a more cohesive manner than existing conditions. With existing conditions, the eye is drawn to and focused on the numerous turbines that clutter the view by sticking up and across the hillsides and ridgelines. The replacement of the many existing smaller and older turbines with proportionally far fewer and less intrusive fourth-generation turbines would serve Policies 170 and 215 of the ECAP, and serve to protect and enhance scenic values.

This impact would be less than significant. No mitigation is required.

Impact AES-4a-1: Substantially degrade the existing visual character or quality of the site and its surroundings—program Alternative 1: 417 MW (less than significant with mitigation)

The program primarily would be visible to recreationists, area residents, motorists, and employees of the businesses (see *Vicinity Character* section for details).

As discussed in the *Vicinity Character* section, the area is mostly characterized by grass-covered, rounded hills and smooth contours. Strings of turbines, plus power lines, transformers, access roads, and substations are the most visually distinct artificial feature throughout most of the program area. In addition, although the new, more efficient turbines are larger than the existing turbines, the new widely spaced configuration detracts less from the natural landscape than the existing string configuration (Figures 3.1-3 to 3.1-7). This configuration allows for views of the rolling, grassy terrain to become more prominent, back-dropped against the sky, and less interrupted by anthropogenic features. While the larger turbines would draw viewers' attention toward them, the eye is also able to follow the ridgeline of the hills in a more cohesive manner than existing conditions. With existing conditions, the eye is drawn to and focused on the numerous turbines that clutter the view by sticking up and across the hillsides and ridgelines. Because of this, program implementation in areas where turbines currently exist would not substantially degrade the existing visual character or quality of the program area and would improve views where existing turbine threads are replace with much fewer of the new larger turbines.

However, no turbines currently exist in the southern portion of the program area, starting approximately 2.5 miles south of Patterson Pass Road, and there are other patches throughout the program area where no turbines currently exist (Figure 2-3). Because turbine locations for the program have not yet been determined, it is possible that turbines would be sited in these areas. The program would construct access roads, turbines, and the associated foundations, collection systems, and communication systems, and meteorological towers. This would substantially degrade the existing visual character and quality of these areas.

The area south of Patterson Pass Road is sparsely populated. There are only a few residences on Tesla Road, which is also a County-designated scenic route. The potential future Tesla Regional Preserve is in this area. In addition, the Carnegie State Vehicular Recreation Area is just south of the program area boundary (Figure 3.1-2), and there are various recreation trails in this area as well. New turbines associated with the program could be visible from these areas, and residents and recreationists are considered highly sensitive viewers. In addition, motorists along Tesla Road would not be accustomed to wind turbines along that route, and although motorists are considered moderately sensitive, Tesla Road is a County-designated scenic route.

In addition, there are no existing turbines currently located on a portion of the site along Flynn Road, but there are turbines within 0.5 mile that are visible from this site. Turbines are a part of the existing visual character of the site vicinity. However, the project would also entail construction of access roads, turbines and foundations, collection system, communication system, and meteorological towers on this portion of the site. These changes would substantially degrade the existing visual character and quality of this undeveloped site.

According to Policy 170 of the ECAP, Alameda County is obligated to protect nearby existing uses from potential visual and other impacts generated by the construction and operation of windfarm facilities (see *Regulatory Setting* section). Several residences in the vicinity would have views of this portion of the project area. Because residents are considered highly sensitive viewers, constructing turbines in this area would conflict with Policy 170. This impact would be significant, but implementation of Mitigation Measures AES-2a, AES-2b, AES-2c, and AES-3 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-2a: Require site development review

Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

Mitigation Measure AES-2c: Screen surplus parts and materials

Mitigation Measure AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road

Impact AES-4a-2: Substantially degrade the existing visual character or quality of the site and its surroundings—program Alternative 2: 450 MW (less than significant with mitigation)

The program primarily would be visible to recreationists, area residents, motorists, and employees of the businesses (see *Vicinity Character* section for details).

As discussed in the *Vicinity Character* section, the area is mostly characterized by grass-covered, rounded hills and smooth contours. Strings of turbines, plus power lines, transformers, access roads, and substations are the most visually distinct artificial feature throughout most of the program area. In addition, although the new, more efficient turbines are larger than the existing turbines, the new widely spaced configuration detracts less from the natural landscape than the existing string configuration (Figures 3.1-3 to 3.1-7). As seen in the simulations for this alternative, only the tops of the turbines and turbine blades of these new turbines would be visible, if visible at all, given the hilly terrain that acts to obscure the rest of the turbine body from view. The additional turbines associated with Alternative 2 are barely noticeable and would result in visual changes that are unperceivable compared to Alternative 1. Like Alternative 1, the configuration of Alternative 2 allows for views of the rolling, grassy terrain to become more prominent, back-dropped against the sky, and less interrupted by anthropogenic features. While the larger turbines would draw viewers' attention toward them, the eye is also able to follow the ridgeline of the hills in a more cohesive manner than under existing conditions. With existing conditions, the eye is drawn to and focused on the numerous turbines that clutter the view by sticking up and across the hillsides and ridgelines. Because of this, program implementation in areas where turbines currently exist would not substantially degrade the existing visual character or quality of the program area and would improve views where existing turbine threads are replace with far fewer of the new larger turbines.

However, as with Alternative 1, no turbines currently exist in the southern portion of the program area, starting approximately 2.5 miles south of Patterson Pass Road, and there are other patches throughout the program area where no turbines currently exist (Figure 2-3). Because turbine locations for the program have not yet been determined, it is possible that turbines would be sited in these areas. The program would construct access roads; turbines; the associated foundations, collection systems, and communication systems; and meteorological towers. This would substantially degrade the existing visual character and quality of these areas.

The area south of Patterson Pass Road is sparsely populated. There are only a few residences on Tesla Road, which is also a County-designated scenic route. The potential future Tesla Regional Preserve is in this area. In addition, the Carnegie State Vehicular Recreation Area is just south of the program area boundary (Figure 3.1-2), and there are various recreation trails in this area as well. New turbines associated with the program could be visible from these areas, and residents and recreationists are considered highly sensitive viewers. In addition, motorists along Tesla Road would not be accustomed to wind turbines along that route, and although motorists are considered moderately sensitive, Tesla Road is a County-designated scenic route.

In addition, there are no existing turbines currently located on a portion of the site along Flynn Road. There are turbines within 0.5 mile that are visible from this site, but they are not in the near foreground. Turbines are a part of the existing visual character of the site vicinity. However, the project would construct access roads, turbines, and the associated foundation, collection system, communication system, and meteorological towers on this portion of the site. These changes would substantially degrade the existing visual character and quality of this undeveloped site. There several residences in the vicinity that would have views of this portion of the site. Residents are considered highly sensitive viewers.

According to Policy 170 of the ECAP, Alameda County is obligated to protect nearby existing uses from potential visual and other impacts generated by the construction and operation of windfarm facilities (see *Regulatory Setting* section). Since there residences in the vicinity that would have views of the site, constructing turbines on this site would conflict with Policy 170. Therefore, this impact would be significant, but implementation of Mitigation Measures AES-2a, AES-2b, AES-2c, and AES-3 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-2a: Require site development review

Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

Mitigation Measure AES-2c: Screen surplus parts and materials

Mitigation Measure AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road

Impact AES-4b: Substantially degrade the existing visual character or quality of the site and its surroundings—Golden Hills Project (less than significant with mitigation)

As for the program, the Golden Hills Project would be primarily visible to recreationists, area residents, motorists, and employees of businesses (see *Vicinity Character* section for details).

The new, more efficient turbines are larger and more widely spaced than the existing turbine configuration, which detracts less from the natural landscape than the existing string configuration (Figures 3.1-3 to 3.1-7). Repowering of the Golden Hills Project would be conducted in areas where turbines currently exist and so would not substantially degrade the existing visual character or quality of the Golden Hills project area and would improve views where existing turbine threads are replaced with fewer of the new, larger turbines. In addition, although I-580, Flynn Road, and

Patterson Pass Road are County-designated scenic routes, motorists on these roads are accustomed to the existing turbines along these routes.

As discussed in detail above, there are no existing turbines currently on a portion of the site along Flynn Road, and constructing turbines on this site would substantially degrade the existing visual character and quality in this area significantly affecting highly sensitive residents in the vicinity.

According to Policy 170 of the ECAP, Alameda County is obligated to protect nearby existing uses from potential visual and other impacts generated by the construction and operation of windfarm facilities. Since there are residences in the vicinity that would have views of this area, constructing turbines on this site would conflict with Policy 170. Implementation of Mitigation Measures AES-2a, AES-2b, and AES-2c, and AES-3 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-2a: Require site development review

Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

Mitigation Measure AES-2c: Screen surplus parts and materials

Mitigation Measure AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road

Impact AES-4c: Substantially degrade the existing visual character or quality of the site and its surroundings—Patterson Pass Project (less than significant with mitigation)

The Patterson Pass Project would be primarily visible to motorists along Patterson Pass Road and employees of nearby businesses (see *Vicinity Character* section for details). As discussed in the *Existing Viewer Groups and Viewer Responses* section, motorists are considered to have moderate visual sensitivity, and employees of businesses are considered to have low visual sensitivity.

The Patterson Pass Project vicinity is characterized by grassy, rolling hills with strings of turbines, transmission lines, and access roads. There are 317 turbines and associated infrastructure in the Patterson Pass project area. The Patterson Pass Project would remove the existing turbines and would construct 8–12 turbines and associated foundations and infrastructure on the site, as described in Section 2.6.2, *Patterson Pass Project*. Although the new, more efficient turbines are larger than the existing turbines, the new widely spaced configuration detracts less from the natural landscape than the existing string configuration. Refer to Figure 3.1-6 for a representative simulation. This configuration allows for views of the rolling, grassy terrain to become more prominent, back-dropped against the sky, and less interrupted by anthropogenic features. While the larger turbines would draw viewers' attention toward them, the eye is also able to follow the ridgeline of the hills in a more cohesive manner than existing conditions. With existing conditions, the eye is drawn to and focused on the numerous turbines that clutter the view by sticking up and across the hillsides and ridgelines.

For these reasons, the Patterson Pass Project would not substantially degrade the existing visual character or quality of the Patterson Pass Project site or surrounding area and would improve views because the existing turbine threads would be replaced with much fewer of the new larger turbines. In addition, although Patterson Pass Road is a County-designated scenic route, motorists on this road are accustomed to the existing turbines along the route, and there are no other sensitive viewers in the Patterson Pass Project vicinity.

According to Policy 170 of the ECAP, Alameda County is obligated to protect nearby existing uses from potential visual and other impacts generated by the construction and operation of windfarm facilities. Since there residences in the vicinity that would have views of the site, constructing turbines on this site would conflict with Policy 170. The project would introduce large, visually obtrusive turbines within existing viewsheds. Implementation of Mitigation Measures AES-2a, AES-2b, and AES-2c would reduce this impact to a less-than-significant level.

Mitigation Measure AES-2a: Require site development review

Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

Mitigation Measure AES-2c: Screen surplus parts and materials

Impact AES-5a-1: Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area—program Alternative 1: 417 MW (less than significant with mitigation)

As discussed in the project description under *Lighting*, all repowered wind turbines would require Federal Aviation Administration (FAA) lighting. This could affect daytime and nighttime views in the program area. However, because the program would replace existing turbines strings with much fewer of the larger, more efficient turbines, the amount of FAA-required lighting in the program area is expected to be similar to existing turbine lighting in the program area. Therefore, the proposed program would not create a new source of substantial light in the program area that would affect daytime or nighttime views.

There are currently nine substations owned and operated by the wind companies within the program area. One substation per project is expected to be required as part of the program. These substations may be newly constructed, or existing substations may be reconstructed or expanded. Existing substations may be replaced in the same general locations. As described in the project description, under *Collector Substations,* substations would be lighted for safety and security. Because any new lights would be shielded or directed downward to reduce glare, this impact would be less than significant.

Generally, turbines are painted white. Because the existing turbines would be replaced with far fewer of the larger, more efficient turbines, this source of glare is expected to be reduced in areas where turbines currently exist. However, in areas where no turbines currently exist, their presence could be a new source of substantial glare. Moreover, as stated in the project description, the color of towers and rotors on the new turbines would be neutral and nonreflective (e.g., dull white or light gray).

Blade rotation could cause shadow flicker that could be a visual intrusion to viewers and could be especially disruptive to residents who would be exposed to these conditions for long periods of time (Department of Energy and Climate Change no date). As shown in Table 2-2, Alameda County has developed setback requirements for siting turbines in relation to certain types of land uses, and turbines would not be allowed to be located within these setback distances. However, these setbacks may not be sufficient to prevent shadow flicker with the new, taller turbines. Implementation of Mitigation Measure AES-5 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker

Where shadow flicker could result from the installation of wind turbines proposed near residences (i.e., within 500 meters [1,640 feet] in a generally east or west direction to account for seasonal variations), the project applicant will prepare a graphic model and study to evaluate shadow flicker impacts on nearby residences. No shadow flicker in excess of 30 minutes in a given day or 30 hours in a given year will be permitted. If it is determined that existing setback requirements as established by the County are not sufficient to prevent shadow flicker impacts on residences, Alameda County will require an increase in the required setback distances to ensure that residences are not affected. If any residence is affected by shadow flicker within the 30-minute/30-hour thresholds, the applicant will implement measures to minimize the effect, such as relocating the turbine; providing opaque window coverings, window awnings, landscape buffers, or a combination of these features to reduce flicker to acceptable limits for the affected receptor; or shutting down the turbine during the period shadow flicker would occur. Such measures may be undertaken in consultation with owner of the affected residence. If the shadow flicker study indicates that any given turbine would result in shadow flicker exceeding the 30-minute/30-hour thresholds and the property owner is not amenable to window coverings, window awnings, or landscaping and the turbine cannot be shut down during the period of shadow flicker, then the turbine will be relocated to reduce the effect to acceptable limits.

Impact AES-5a-2: Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area—program Alternative 2: 450 MW (less than significant with mitigation)

Under Alternative 2, 21 additional turbines and associated facilities would be constructed in the program area. Light and glare impacts would be similar at the location of any given feature to those under Alternative 1, but the amount of light and glare would only result in a small incremental increase compared with Alternative 1.

As discussed in the project description under *Lighting*, all repowered wind turbines would require Federal Aviation Administration (FAA) lighting. This could affect daytime and nighttime views in the program area. However, because the program would replace existing turbines with far fewer of the larger, more efficient turbines, the amount of FAA-required lighting in the program area is expected to be similar to existing turbine lighting in the program area, even with the greater number of turbines that could be installed under Alternative 2. Therefore, the program would not create a new source of substantial light in the program area that would affect daytime or nighttime views.

One substation per project is expected to be required as part of the program. These substations may be newly constructed, or existing substations may be reconstructed or expanded. Existing substations may be replaced in the same general locations. As described in the project description, under *Collector Substations,* substations would be lighted for safety and security. Because any new lights would be shielded or directed downward to reduce glare, this impact would be less than significant.

Generally, turbines are painted white. Because the existing turbines would be replaced with far fewer of the larger, more efficient turbines, this source of glare is expected to be reduced in areas where turbines currently exist. However, in areas where no turbines currently exist, their presence could be a new source of substantial glare. Moreover, as stated in the project description, the color of towers and rotors on the new turbines would be neutral and nonreflective (e.g., dull white or light gray).

Blade rotation could cause shadow flicker that could be a visual intrusion to viewers and could be especially disruptive to residents who would be exposed to these conditions for long periods of time. As shown in Table 2-2, Alameda County has established setback requirements for siting turbines within certain types of land uses, and turbines would not be allowed to be located within these setback distances. However, these setbacks may not be sufficient to prevent shadow flicker with the new, taller turbines. Implementation of Mitigation Measure AES-5 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker

Impact AES-5b: Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area—Golden Hills Project (less than significant with mitigation)

Like the program, the Golden Hills Project would require FAA lighting. In addition to new turbines, the Golden Hills Project is anticipated to require two new collector substations. However, as stated in the project description under *Collector Substations,* the existing substations would be replaced in the same general location and would include an outdoor lighting system. However, the new lights would be shielded or directed downward to reduce glare, and the new substations would not emit more light than the existing substations.

Because turbines could be installed where no turbines currently exist, a new source of substantial glare could be created. However, as stated in the project description, the color of towers and rotors on the new turbines would be neutral and nonreflective (e.g., dull white or light gray).

Blade rotation could cause shadow flicker that could be a visual intrusion to viewers and could be especially disruptive to residents who would be exposed for long periods of time. Implementation of Mitigation Measure AES-5 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker

Impact AES-5c: Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area—Patterson Pass Project (less than significant with mitigation)

Like the program, the Patterson Pass Project would require FAA lighting. Implementation of the Patterson Pass Project would reduce glare because there would be far fewer turbines on the site, but the larger, bright white surfaces typical of turbines would have the potential to increase glare. This impact would be potentially significant, but as stated in the project description, the color of towers and rotors on the new turbines would be neutral and nonreflective (e.g., dull white or light gray).

Blade rotation could cause shadow flicker that could be a visual intrusion to viewers and could be especially disruptive to residents who would be exposed for long periods of time. Implementation of Mitigation Measure AES-5 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker

Impact AES-6a-1: Consistency with state and local policies—program Alternative 1: 417 MW (less than significant with mitigation)

The County would be obligated to comply with measures set forth to protect visual resources along scenic roadways and open space areas identified for protection, as detailed in the Scenic Route and Open Space Elements of the Alameda County General Plan (Alameda County 1966). In addition, the County is obligated to comply with measures set forth in the ECAP to protect visual resources such as sensitive viewsheds, streets and highways, scenic highways, and areas affected by windfarms (Alameda County 2000). The turbines would be neutral and nonreflective (e.g., dull white or light gray) so as to blend with the surroundings. However, the proposed project would still introduce large, visually obtrusive turbines within existing viewsheds of scenic viewsheds in proximity to sensitive viewers and residences. Implementation of Mitigation Measures AES-2a, AES-2b, AES-2c, and AES-3, and AES-5 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-2a: Require site development review

Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

Mitigation Measure AES-2c: Screen surplus parts and materials

Mitigation Measure AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road

Mitigation Measure AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker

Impact AES-6a-2: Consistency with state and local policies—program Alternative 2: 450 MW (less than significant with mitigation)

Even with the greater number of turbines that could be installed under Alternative 2, the County would be obligated to comply with measures set forth to protect visual resources along scenic roadways and open space areas identified for protection, as detailed in the Scenic Route and Open Space Elements of the Alameda County General Plan (Alameda County 1966). In addition, the County is obligated to comply with measures set forth in the ECAP to protect visual resources such as sensitive viewsheds, streets and highways, scenic highways, and areas affected by windfarms (Alameda County 2000). The turbines would be neutral and nonreflective (e.g., dull white or light gray) so as to blend with the surroundings. However, the proposed project would still introduce large, visually obtrusive turbines within existing viewsheds of scenic viewsheds in proximity to sensitive viewers and residences. Implementation of Mitigation Measures AES-2a, AES-2b, AES-2c, and AES-3, and AES-5 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-2a: Require site development review

Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

Mitigation Measure AES-2c: Screen surplus parts and materials

Mitigation Measure AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road

Mitigation Measure AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker

Impact AES-6b: Consistency with state and local policies—Golden Hills Project (less than significant with mitigation)

Under the Golden Hills Project, the County would be obligated to comply with measures set forth to protect visual resources along scenic roadways and open space areas identified for protection, as detailed in the Scenic Route and Open Space Elements of the Alameda County General Plan (Alameda County 1966). In addition, the County is obligated to comply with measures set forth in the ECAP to protect visual resources such as sensitive viewsheds, streets and highways, scenic highways, and areas affected by windfarms (Alameda County 2000). The turbines would be neutral and nonreflective (e.g., dull white or light gray) so as to blend with the surroundings. While the proposed project would replace smaller existing turbines with larger, more visually obtrusive turbines within existing viewsheds, there will be considerably fewer turbines as a result of repowering. Implementation of Mitigation Measures AES-2a, AES-2b, AES-2c, and AES-3, and AES-5 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-2a: Require site development review

Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

Mitigation Measure AES-2c: Screen surplus parts and materials

Mitigation Measure AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road

Mitigation Measure AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker

Impact AES-6c: Consistency with state and local policies—Patterson Pass Project (less than significant with mitigation)

Under the Patterson Pass Project, the County would be obligated to comply with measures set forth to protect visual resources along scenic roadways and open space areas identified for protection, as detailed in the Scenic Route and Open Space Elements of the Alameda County General Plan (Alameda County 1966). In addition, the County is obligated to comply with measures set forth in the ECAP to protect visual resources such as sensitive viewsheds, streets and highways, scenic highways, and areas affected by windfarms (Alameda County 2000). The turbines would be neutral and nonreflective (e.g., dull white or light gray) so as to blend with the surroundings. However, the proposed project would still introduce large, visually obtrusive turbines within existing viewsheds of scenic viewsheds in proximity to sensitive viewers and residences Implementation of Mitigation Measures AES-2a, AES-2b, AES-2c, and AES-3, and AES-5 would reduce this impact to a less-than-significant level.

Mitigation Measure AES-2a: Require site development review

Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

Mitigation Measure AES-2c: Screen surplus parts and materials

Mitigation Measure AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road

Mitigation Measure AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker

3.1.4 References Cited

Alameda County. 1966. *Scenic Route Element of the General Plan*. May. Reprinted June 1974, Amended May 5, 1994.

———. 1998. *Draft Environmental Impact Report—Repowering a Portion of the Altamont Pass Wind Resource Area*. August. State Clearinghouse #98022024. Hayward, CA: Alameda County Community Development Agency.

———. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

California Department of Transportation. 2012. *Officially Designated State Scenic Highways*. July 11. Available: http://www.dot.ca.gov/hq/LandArch/scenic/schwy.htm. Accessed: July 11, 2013.

Department of Energy and Climate Change. No date. *Update of UK Shadow Flicker Evidence Base*. Final report. Prepared by Parsons Brinckerhoff, Newcastle Upon Tyne, UK.

East Bay Regional Park District. 2007. *East Bay Regional Park District Existing and Potential Parklands and Trails*. Amendment of the 1997 Master Plan Map as approved by the Board of Directors on November 6, 2007.

Federal Highway Administration. 1988. *Visual Impact Assessment for Highway Projects.* (FHWA-HI-88-054.) U.S. Department of Transportation.

Jones, G. R., J. Jones, B. A. Gray, B. Parker, J. C. Coe, J. B. Burnham, and N. M. Geitner. 1975. A Method for the Quantification of Aesthetic Values for Environmental Decision Making. *Nuclear Technology* 25(4):682–713.Sunrise Sunset. 2013. *Sunrise Sunset Calendar: California Locations*. Last revised: 2013. Available: http://www.sunrisesunset.com/USA/California.asp. Accessed: August 27, 2013.

TriLink. 2014. *Corridor Considerations and Potential Routes*. Last revised: 2012. Available: http://trilink239.org/corridor-considerations/. Accessed: February 24, 2014.

U. S. Bureau of Land Management. 1980. *Visual Resource Management Program.* (Stock No. 024-001-00116-6.) Washington, DC: U.S. Government Printing Office.

U.S. Forest Service. 1995. *Landscape Aesthetics: A Handbook for Scenery Management.* (Agriculture Handbook Number 701.)

U.S. Soil Conservation Service. 1978. *Procedure to Establish Priorities in Landscape Architecture*. (Technical Release No. 65.) Washington, DC.

1. From east bank of Bethany Reservoir looking northwest.

2. From westbound I-580 looking southwest.

Graphics ... 00323.08 (7-18-2013)

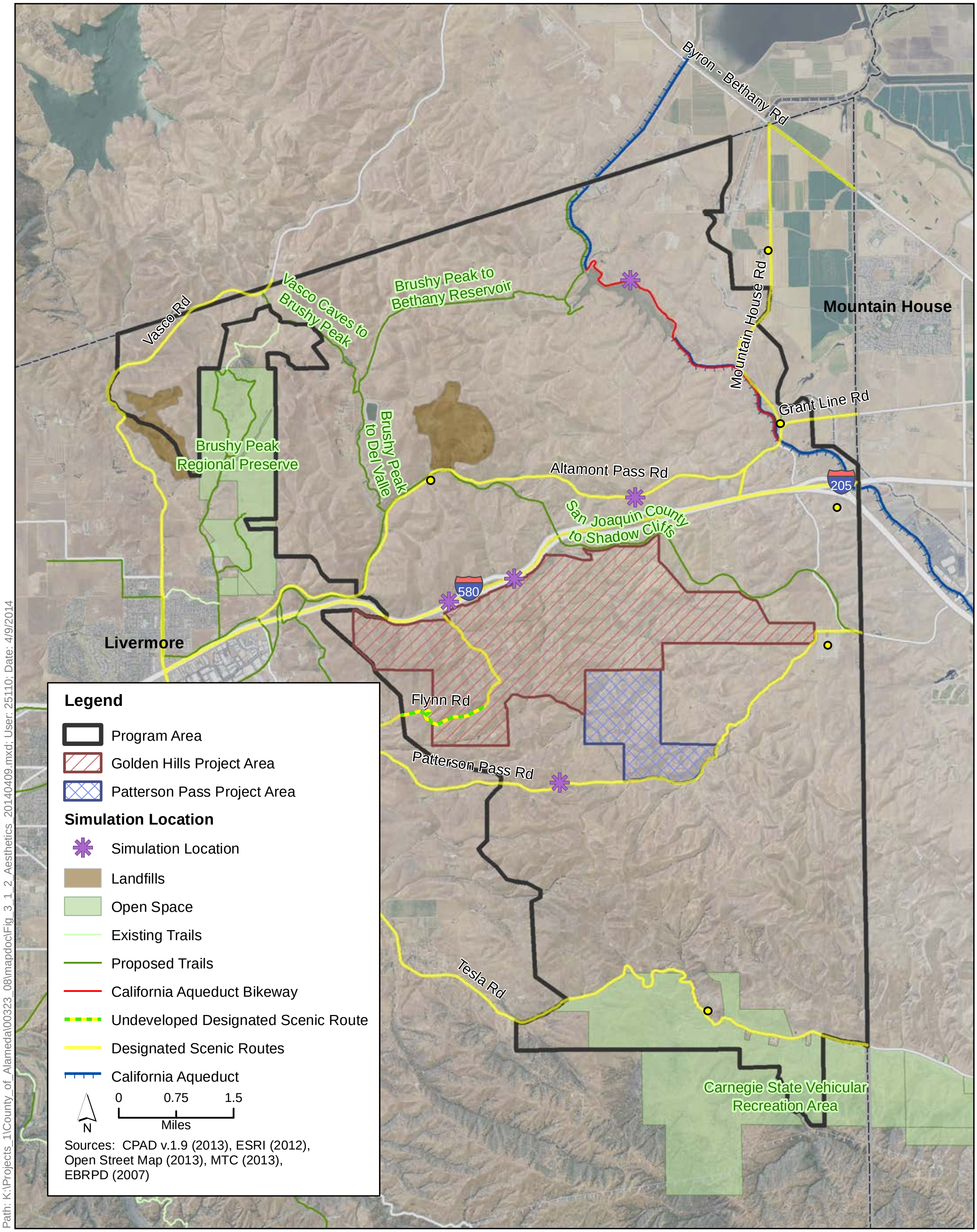
Altamont Pass Wind Resource Area
Repowering Program

Figure 3.1-1
Turbine Presence in the Program Area

3. From Patterson Pass Road looking east.

4. Midway Substation from Patterson Pass Road looking east.

Figure 3.1-1 (continued)
Turbine Presence in the Program Area



Altamont Pass Wind Resource Area Repowering Program

Figure 3.1-2
Visual Resources in the Program Area

Graphics … 00323.08 (1-14-2014)

Figure 3.1-3
Existing and Simulated Views from Bethany Reservoir


Existing View
Looking east from eastbound I-580,
1.23 miles east of the North Flynn Road overpass


Simulation: Alternative 1


Simulation: Alternative 2
(same as Alternative 1)

Graphics ... 00323.08 (1-8-2014)

Figure 3.1-4
Existing and Simulated Views from Eastbound Interstate 580

Existing View
Looking southwest from westbound I-580,
0.32 mile east of the North Flynn Road overpass

Simulation: Alternative 1

Simulation: Alternative 2
(same as Alternative 1)

Graphics ... 00323.08 (1-9-2014)

Figure 3.1-5
Existing and Simulated Views from Westbound Interstate 580


Existing View
Looking east from Patterson Pass Road
at Patterson Pass


Simulation: Alternative 1


Simulation: Alternative 2

Graphics ... 00323.08 (1-13-2014)

Figure 3.1-6
Existing and Simulated Views of Patterson Pass Project Area

Existing View
Looking west, Altamont Pass Road 1.6 miles west of Grant Line Road

Simulation: Alternative 1

Simulation: Alternative 2

Graphics ... 00323.08 (1-14-2014)

Figure 3.1-7
Existing and Simulated Views from Altamont Pass Road

3.2 Agricultural and Forestry Resources

This section describes the regulatory and environmental setting for agricultural and forestry resources in the program and project areas. It also describes impacts on these resources that could result from implementation of the program and the two individual projects. Mitigation measures are prescribed where feasible and appropriate.

3.2.1 Existing Conditions

Regulatory Setting

Federal

There are no relevant federal regulations for agricultural and forestry resources.

State

Farmland Mapping and Monitoring Program

The California Department of Conservation's (DOC's) Farmland Mapping and Monitoring Program (FMMP), administered by the Division of Land Resource Conservation, is responsible for mapping and monitoring Important Farmlands for most of the state's agricultural areas. The FMMP updates its farmland maps every 2 years based on information from local agencies. FMMP maps show five categories of agricultural lands and three categories of nonagricultural lands, described in the following sections.

Agricultural Lands

Following are descriptions of the farmland mapping categories used by the FMMP. The minimum mapping unit for all agricultural land categories is 10 acres, except for Grazing Land where the minimum mapping unit is 40 acres.

Note that Prime Farmland, Farmland of Statewide Importance, and Unique Farmland are the most suitable for agriculture and are considered especially important agricultural resources. They are often referred to collectively as *important farmland*. Grazing Land may also qualify as important farmland where grazing is a key component of the local economy.

- Prime Farmland is defined by the state as farmland with the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Prime Farmland must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.
- Farmland of Statewide Importance is defined as "irrigated land similar to Prime Farmland that has a good combination of physical and chemical characteristics for the production of agricultural crops." However, this land has minor shortcomings, such as steeper slopes or less ability to store soil moisture than Prime Farmland. In order for land to be designated as Farmland of Statewide Importance, it must have been used for production of irrigated crops at some time during the 4 years prior to the mapping date.

- Unique Farmland is considered to consist of lower-quality soils but nonetheless is used for production of the state's leading agricultural crops. Unique Farmland is usually irrigated, but may include nonirrigated orchards or vineyards in some climatic zones. To qualify for this designation, land must have been used for crops at some time during the 4 years prior to the mapping date.
- Farmland of Local Importance is land identified as important to the local agricultural economy by each county's board of supervisors and a local advisory committee.
- Grazing Land is land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with the California Cattlemen's Association, the University of California Cooperative Extension, and other groups interested in the extent of grazing activities.

Nonagricultural Lands

Following are descriptions of the nonagricultural land mapping categories used by the FMMP. Mapping units for nonagricultural lands vary, as described below.

- Urban and Built-Up Lands consist of land occupied by structures with a building density of at least 1 structure to 1.5 acres, or approximately 6 structures to a 10-acre parcel. This type of land is used for residential, industrial, commercial, construction, institutional, and public administration purposes; railroad and other transportation yards; cemeteries; airports; golf courses; sanitary landfills; sewage treatment facilities; water control structures; and other developed purposes.
- Other Land is land not included in any other mapping category. Examples include low-density rural developments and brush, timber, wetland, and riparian areas not suitable for livestock grazing. This category also includes vacant and nonagricultural land surrounded on all sides by urban development; confined livestock, poultry, or aquaculture facilities; strip mines; borrow pits; and water bodies smaller than 40 acres.
- Water includes perennial water bodies with an extent of at least 40 acres.

California Land Conservation Act (Williamson Act)

The Williamson Act is one of the state's primary mechanisms for conserving farmland. It enables counties and cities to designate agricultural preserves (Williamson Act lands) and to offer preferential taxation to private agricultural landowners based on the income-producing value of their property in agricultural use, rather than on the property's assessed market value. In return for the preferential tax rate, the landowner is required to sign a contract with the county or city agreeing not to develop the land for a minimum 10-year period. Contracts are automatically renewed annually unless a party to the contract files for nonrenewal or petitions for cancellation. If the landowner chooses not to renew the contract, it expires at the end of its duration. Under certain circumstances, a county or city may approve a request for cancellation of a Williamson Act contract. Cancellation requires private landowners to pay back taxes and cancellation fees.

Each city and county has the discretion to determine which land uses are compatible with Williamson Act contracts within their jurisdiction, provided these uses are not prohibited under the Act.

California Public Resources Code

PRC Section 12220(g) defines "Forest land" as "land that can support 10% native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits." PRC Section 4526 defines "Timberland" as "land, other than land owned by the federal government…which is available for, and capable of, growing a crop of trees of a commercial species used to produce lumber and other forest products, including Christmas trees…"

Local

Alameda County

East County Area Plan

The Land Use Element (Alameda County 2000) contains goals, policies, and programs related to Sensitive Lands and Regionally Significant Open Space, including Agriculture. The following goals, policies, and programs are applicable to the program.

Goal: To protect regionally significant open space and agriculture land from development.

Policy 52: The County shall preserve open space areas for the protection of public health and safety, provision of recreational opportunities, production of natural resources (e.g., agriculture, windpower, and mineral extraction), protection of sensitive viewsheds (see definition in Table 1 [of East County Area Plan]), preservation of biological resources, and the physical separation between neighboring communities (see Figure 4 [of East County Area Plan]).

Goal: To maximize long-term productivity of East County's agricultural resources.

Policy 71: The County shall conserve prime soils (Class I and Class II, as defined by the USDA Soil Conservation Service Land Capability Classification) and Farmland of Statewide Importance and Unique Farmland (as defined by the California Department of Conservation Farmland Mapping and Monitoring Program) outside the Urban Growth Boundary.

Policy 76: The County shall work with San Joaquin, Contra Costa, and Santa Clara Counties to ensure that any development adjacent to Alameda County agricultural land mitigates impacts on agricultural land including air quality, water quality, and incompatibilities with agricultural uses. In particular, measures to mitigate growth-inducing impacts of development on agricultural land in Alameda County shall be addressed through cooperative efforts among the counties. The County shall ensure that land uses within Alameda County adjacent to San Joaquin, Contra Costa, and Santa Clara Counties are compatible with adjacent agricultural uses in these other counties.

Program 40:

*Program 40: The Zoning Ordinance shall have an "A-160" (Agriculture—160-acre minimum parcel size) District and an "A-320" (Agriculture—320-acre minimum parcel size) District. The "A-160" (Agriculture—160-acre minimum parcel size) District shall cover the following area: the Wind Resource Area (see Figure 4 - Open Space Diagram [of East County Area Plan]), except lands easterly of the California Aqueduct, and lands to the south of Tesla Road that are within one mile of Tesla Road between the San Joaquin County boundary and the South Livermore Valley Plan. The "A-320" (Agriculture—320-acre minimum parcel size) District shall cover lands located generally to the south of the following boundary: parallel to and one mile south of Tesla Road from the San Joaquin County boundary to the South Livermore Valley Plan Area; the southern boundary of the South Livermore Valley Plan Area; parallel to and one mile south of Vallecitos Road from the South Livermore Valley Plan Area to the intersection of the one mile line with the northern boundary of San Francisco Water Department lands surrounding San

Antonio Reservoir; the northern boundary of the San Francisco Water Department lands to the north/south section line directly west of San Antonio Reservoir; a line following the north/south section line to its intersection with Calaveras Road; and the northern boundary of the East Bay Regional Park District property located between Calaveras Road and the western boundary of the East County planning area. The Zoning Ordinance shall include "grandfather clauses" to recognize the rights of property owners. Lands rezoned to "A-160" and "A-320" shall maintain the designations shown on the East County Area Plan Land Use Diagram.

Zoning Ordinance (Alameda County Code, Title 17)

The program area is zoned A (Agricultural District). This zoning district protects existing agricultural uses and encourages a wide range of agricultural uses in nonurban areas. Certain nonagricultural uses, including privately-owned wind-electric generators, are considered conditional uses and are permitted in an A district if approved by the board of zoning adjustments.

Right to Farm

Alameda County's "Right-to-Farm" ordinance is set forth in Chapter 6.28 of the Municipal Code. This ordinance is designed to promote public health, safety and welfare, and to support and encourage continued agricultural operations in the county. A Right-to-Farm ordinance protects farmland by requiring disclosure to purchasers and users of property next to or near agricultural operations of the inherent potential problems associated with living near actively farmed land.

Environmental Setting

The environmental setting for agriculture comprises the location of agricultural lands, the type of crops, the DOC farmland classifications, and lands designated under the Williamson Act in the program area.

State Farmland Classifications

According to the California Department of Conservation Alameda Important Farmland 2010 Map, the majority of the program area (approximately 41,837 acres) is designated as Grazing Land and is primarily used for cattle grazing. Table 3.2-1 presents a summary of agricultural acreage found in the program area. As shown in Figure 3.2-1, a very small amount of Prime Farmland is present in the northeast corner of the program area.

Table 3.2-1. FMMP Acreage in the Program Area

FMMP Land Cover	Acres
Urban and Built-up Land	829.04
Grazing Land	41,837.07
Prime Farmland	24.21
Farmland of Statewide Importance	0.36
Water	163.11
Other Land	503.80
Total	42,257.59

Source: California Department of Conservation 2010.

Farmland Conversion

The FMMP also produces a report every 2 years on the amount of land converted from agricultural to nonagricultural use. Table 3.2-2 summarizes recent changes to FMMP-classified agricultural land within Alameda County. The County experienced a net loss of 342 acres of agricultural land between 2008 and 2010. The most significant loss was in Grazing Land.

Table 3.2-2. Alameda County Farmland Conversions 2008–2010

	Total Acres Inventoried		2008–2010 Acreage Changes		
Land Use Category	2008	2010	Acres Lost	Acres Gained	Net Change
Prime Farmland	3,958	3,953	92	87	-5
Farmland of Statewide Importance	1,290	1,230	97	37	-60
Unique Farmland	2,441	2,383	122	64	-58
Grazing Land	244,252	244,033	641	422	-219
Agricultural Land Subtotal	251,941	251,599	952	610	-342

Source: California Department of Conservation 2010.

Williamson Act Lands

Approximately 135,031 acres of County farmland were enrolled in Williamson Act contracts in 2009 (California Department of Conservation 2010). Figure 3.2-2 shows the Williamson Act parcels in the program area. Approximately 31,420 acres of Williamson Act contracts lie within the program area. All the Williamson Act contracted land in the program area is Non–Prime Farmland.

Crops and Livestock

The top five agricultural products in 2011 in terms of value were wine grapes, ornamental trees and shrubs, cattle and calves, range pasture, and hay (Alameda County Community Development Agency 2012). The primary crop in the program area is pasture and range, which is primarily used for cattle grazing. Table 3.2-3 presents the extent of agricultural products reported for Alameda County in 2011.

Table 3.2-3. Alameda County Crops in 2011

Crop/Item	Harvested Acres/Units	Economic Value
Field Crops		
Hay, alfalfa	704	$715,000
Hay, other	4771	$1,115,000
Range pasture	182,000	$2,766,000
Miscellaneous (e.g., corn, silage, barley, oats, wheat, irrigated pasture)	973	$715,000
Nursery Products		
Ornamental trees and shrubs	158	$10,865,000
Miscellaneous	68	$1,282,000
Fruit and Nut Crops		
Grapes, red	1988	$9,157,000
Grapes, white	658	$2,759,000
Miscellaneous (e.g., olives, walnuts, pistachios, strawberries)	321	$127,000
Vegetable Crops		
Miscellaneous vegetables (e.g., broccoli, cabbage, corn, fava beans, leaf lettuce, greens, pumpkins, tomatoes, squash)	82	$785,000
Livestock and Poultry		
Cattle and calves	13,794 head	$10,329,000
Miscellaneous poultry and livestock products (includes rabbits, sheep, wool, lambs, hogs, beans, and apiary products)	N/A	$565,000
Source: Alameda County Community Development Agency 2012.		

Forestry Resources

The Altamont Hills, including the program area, are dominated by grassland and not likely to support 10% native tree cover under natural conditions because the soils, in combination with annual rainfall and other climatic conditions, are not conducive to the specified distribution of oak or other tree species. There are no forestry resources in the program area.

3.2.2 Environmental Impacts

This section describes the impact analysis relating to agricultural resources for the program and the two individual projects. It describes the methods used to determine the impacts of the projects and program and lists the thresholds used to conclude whether an impact would be significant. If applicable, measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion.

Methods for Analysis

Identifying the impacts on the program area's agricultural resources involved a review of the Alameda County Zoning Map and zoning ordinance and the Alameda County Important Farmland 2010 map.

Determination of Significance

In accordance with Appendix G of the State CEQA Guidelines, program Alternative 1, program Alternative 2, the Golden Hills project, or the Patterson Pass project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to nonagricultural use.
- Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract.
- Conflict with existing zoning for, or cause rezoning of forest land (as defined in PRC Section 12220[g]), timberland (as defined by PRC Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104[g]).
- Result in the loss of forest land or conversion of forest land to non-forest use.
- Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use.

Impacts and Mitigation Measures

Impact AG-1a-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use—program Alternative 1: 417 MW (less than significant with mitigation)

As shown above in Figure 3.2-1 and Table 3.2-1, nearly all the land within the program area is classified as Grazing Land. There are 24.21 acres of Prime Farmland in the northeast portion of the program area, and 0.36 acre of Farmland of Statewide Importance on the eastern edge of the program area (Figure 3.2-1).

Some land would be used temporarily for meteorological tower installation, which could require a small concrete pad for each tower. In addition, land would be used temporarily for a main construction staging area. Some existing roads would be widened and some new service roads would be developed. Land would also be used to construct foundations for the new wind turbines. Exact locations of meteorological towers, construction staging areas, and roads are not known at this time. One substation per project is expected to be required as part of the program. These substations may be newly constructed or existing, and existing substations may need to be reconstructed or expanded. Existing substations may be replaced in the same general locations.

The land used temporarily for construction purposes would be reclaimed. Once the meteorological towers have collected adequate information, they would be removed and the sites would be reclaimed. The construction staging area would be reclaimed, and after construction new or widened roads that are not wanted by landowners would also be reclaimed. The wind companies will be required to remove all facilities and restore properties to pre-installation conditions once the windfarm is decommissioned.

If installation of new turbines or associated facilities results in the permanent conversion of Prime Farmland or Farmland of Statewide Importance to nonagricultural uses, then there would be a potentially significant impact on agricultural resources. Implementation of Mitigation Measure AG-1 would reduce this impact to a less-than-significant level.

Mitigation Measure AG-1: Avoid conversion of Prime Farmland

Project proponents will not place wind turbines or other related facilities/infrastructure in locations that would result in the permanent conversion of land that is Prime Farmland or Farmland of State Importance.

Impact AG-1a-2: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use—program Alternative 2: 450 MW (less than significant with mitigation)

As shown above in Figure 3.2-1 and Table 3.2-1, nearly all the land within the program area is classified as Grazing Land. There are 24.21 acres of Prime Farmland in the northeast portion of the program area, and 0.36 acre of Farmland of Statewide Importance on the eastern edge of the program area (Figure 3.2-1).

Some land would be used temporarily for meteorological tower installation, which could require a small concrete pad for each tower. In addition, land would be used temporarily for a main construction staging area. Some existing roads would be widened and some new service roads would be developed. Land would also be used to construct foundations for the new wind turbines. Exact locations of meteorological towers, construction staging areas, and roads are not known at this time. One substation per project is expected to be required as part of the program. These substations may be newly constructed or existing, and existing substations may need to be reconstructed or expanded. Existing substations may be replaced in the same general locations.

The land used temporarily for construction purposes would be reclaimed. Once the meteorological towers have collected adequate information, they would be removed and the sites would be reclaimed. The construction staging area would be reclaimed, and after construction new or widened roads that are not wanted by landowners would also be reclaimed. The wind companies will be required to remove all facilities and restore properties to pre-installation conditions once the windfarm is decommissioned.

If installation of new turbines or associated facilities results in the permanent conversion of Prime Farmland or Farmland of Statewide Importance to nonagricultural uses, then there would be a potentially significant impact on agricultural resources. Implementation of Mitigation Measure AG-1 would reduce this impact to a less-than-significant level.

Mitigation Measure AG-1: Avoid conversion of Prime Farmland

Impact AG-1b: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use—Golden Hills Project (no impact)

The Golden Hills project site is shown on Figure 3.2-1. As stated above and shown on Figure 3.2-1, the only Prime Farmland is 24.21 acres in the northeast corner of the program area, outside of the

Golden Hills project site. There is no Prime Farmland, Unique Farmland, or Farmland of Statewide Importance in the Golden Hills project area. Because the proposed project would not permanently convert any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, there would be no impact. No mitigation is required.

Impact AG-1c: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use—Patterson Pass Project (no impact)

The Patterson Pass Project is located in the southeastern portion of the program area. As stated above, the only Prime Farmland and Farmland of Statewide Importance is in the northeast corner of the program area. None of the farmland within the Patterson Pass project area is classified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Most of the project area is classified as Grazing Land under the FMMP. Existing conditions include active, ongoing agricultural use. Because the project would not permanently convert any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, there would be no impact. No mitigation is required.

Impact AG-2a-1: Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract—program Alternative 1: 417 MW (no impact)

Wind turbines are a conditionally permitted use in the agricultural zone applied to the program area. As shown in Figure 3.2-2, all of the Williamson Act land within the project area is Non-Prime Farmland. Wind turbines are a compatible use, allowed under the Williamson Act contracts for grazing land covering the program area. The replacement of wind turbine towers on land currently under Williamson Act contract would not remove the land from Williamson Act contract status. There would be no impact. No mitigation is required.

Impact AG-2a-2: Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract—program Alternative 2: 450 MW (no impact)

Wind turbines are a conditionally permitted use in the agricultural zone applied to the program area. As shown in Figure 3.2-2, all of the Williamson Act land within the project area is Non-Prime Farmland. Wind turbines are a compatible use, allowed under the Williamson Act contracts for grazing land covering the program area. The replacement of wind turbine towers on land currently under Williamson Act contract would not remove the land from Williamson Act contract status. There would be no impact. No mitigation is required.

Impact AG-2b: Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract—Golden Hills Project (no impact)

Wind turbines are a conditionally permitted use in the agricultural zone applied to the project area. Wind turbines are a compatible use, allowed under the Williamson Act contracts covering the project area. The replacement of wind turbine towers on land currently under Williamson Act contract would not remove the land from Williamson Act contract status. There would be no impact. No mitigation is required.

Impact AG-2c: Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract—Patterson Pass Project (no impact)

Wind turbines are a conditionally permitted use in the agricultural zone applied to the project area. Wind turbines are a compatible use, allowed under the Williamson Act contracts covering the project area. The replacement of wind turbine towers on land currently under Williamson Act contract would not remove the land from Williamson Act contract status. There would be no impact. No mitigation is required.

Impact AG-3a-1: Conflict with existing zoning for, or cause rezoning of forest land, timberland, or timberland zoned Timberland Production—program Alternative 1: 417 MW (no impact)

There is no forest land in the program area. Therefore, there would be no impact. No mitigation is required.

Impact AG-3a-2: Conflict with existing zoning for, or cause rezoning of forest land, timberland, or timberland zoned Timberland Production—program Alternative 2: 450 MW (no impact)

There is no forest land in the program area. Therefore, there would be no impact. No mitigation is required.

Impact AG-3b: Conflict with existing zoning for, or cause rezoning of forest land, timberland, or timberland zoned Timberland Production—Golden Hills Project (no impact)

There is no forest land in the project area. Therefore, there would be no impact. No mitigation is required.

Impact AG-3c: Conflict with existing zoning for, or cause rezoning of forest land, timberland, or timberland zoned Timberland Production—Patterson Pass Project (no impact)

There is no forest land in the project area. Therefore, there would be no impact. No mitigation is required.

Impact AG-4a-1: Result in the loss of forest land or conversion of forest land to non-forest use—program Alternative 1: 417 MW (no impact)

There is no forest land in the program area. Therefore, there would be no impact. No mitigation is required.

Impact AG-4a-2: Result in the loss of forest land or conversion of forest land to non-forest use—program Alternative 2: 450 MW (no impact)

There is no forest land in the program area. Therefore, there would be no impact. No mitigation is required.

Impact AG-4b: Result in the loss of forest land or conversion of forest land to non-forest use—Golden Hills Project (no impact)

There is no forest land in the project area. Therefore, there would be no impact. No mitigation is required.

Impact AG-4c: Result in the loss of forest land or conversion of forest land to non-forest use—Patterson Pass Project (no impact)

There is no forest land in the project area. Therefore, there would be no impact. No mitigation is required.

Impact AG-5a-1: Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use—program Alternative 1: 417 MW (less than significant with mitigation)

As stated above, there is a very small amount of Prime Farmland and Farmland of Statewide Importance in the program area. Mitigation Measure AG-1 would ensure that no Prime Farmland or Farmland of Statewide Importance would be directly converted to nonagricultural use. Since Mitigation Measure AG-1 would ensure that no windfarm activities would take place in areas classified as Prime Farmland and Farmland of Statewide Importance, no indirect conversion would occur. In addition, as none of the land within the program area meets the definition of forest land, the proposed program would not result in conversion of forest land to non-forest use and no impact would occur. No additional mitigation is required.

Mitigation Measure AG-1: Avoid conversion of Prime Farmland

Impact AG-5a-2: Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use—program Alternative 2: 450 MW (less than significant with mitigation)

As stated above, there is a very small amount of Prime Farmland and Farmland of Statewide Importance in the program area. Mitigation Measure AG-1 would ensure that no Prime Farmland or Farmland of Statewide Importance would be directly converted to nonagricultural use. Since Mitigation Measure AG-1 would ensure that no windfarm activities would take place in areas classified as Prime Farmland and Farmland of Statewide Importance, no indirect conversion would occur. In addition, as none of the land within the program area meets the definition of forest land, the proposed program would not result in conversion of forest land to non-forest use and no impact would occur. No additional mitigation is required.

Mitigation Measure AG-1: Avoid conversion of Prime Farmland

Impact AG-5b: Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use—Golden Hills Project (no impact)

As stated above, no Prime Farmland or Farmland of Statewide Importance is located within the Golden Hills project site boundaries. Similarly as none of the land within the project area meets the definition of forest land, the proposed project would not result in conversion of forest land to non-forest use and no impact would occur. No mitigation is required.

Impact AG-5c: Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use—Patterson Pass Project (no impact)

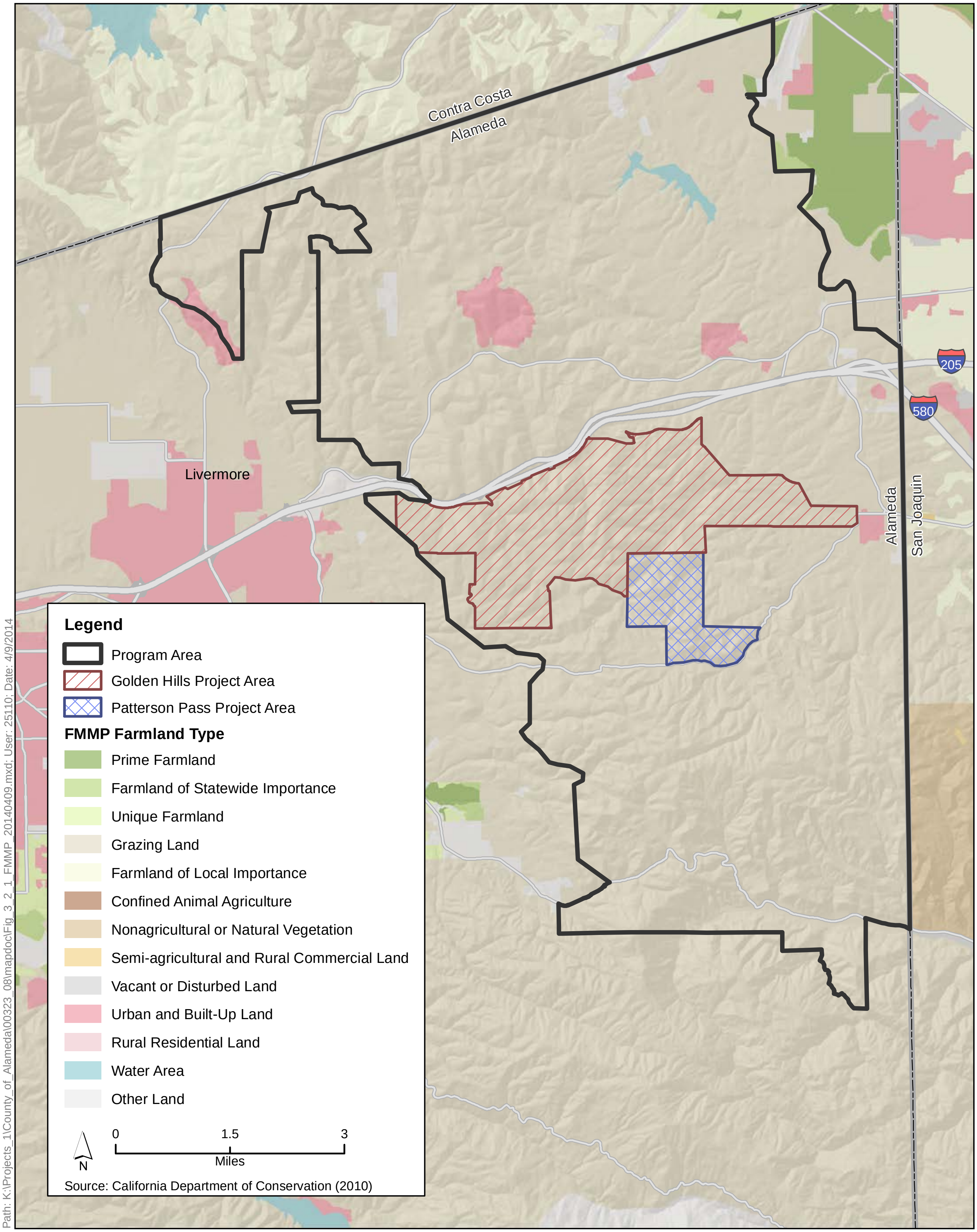
As stated above, no Prime Farmland or Farmland of Statewide Importance is located within the Patterson Pass project site boundaries. Similarly as none of the land within the project area meets the definition of forest land, the proposed project would not result in conversion of forest land to non-forest use and no impact would occur. No mitigation is required.

3.2.3 References Cited

Alameda County. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

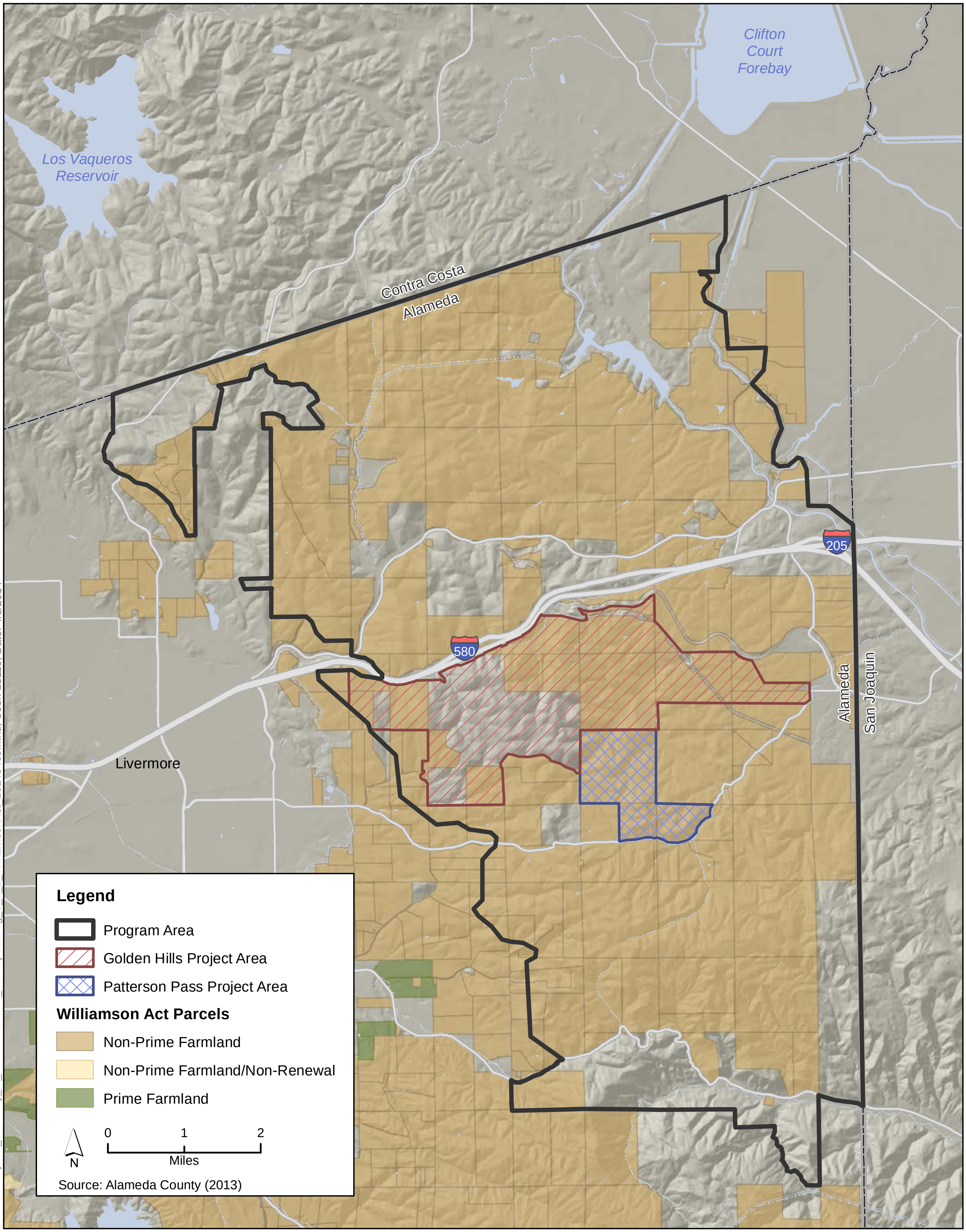
Alameda County Community Development Agency. 2012. *2011 Crop Report*. Available: http://www.acgov.org/cda/awm/resources/2011cropreport.pdf. Accessed: June 17, 2013.

California Department of Conservation. 2010. *Alameda County Important Farmland Data. Table A-1. Alameda County 2008–2010 Land Use Conversion*. Available: http://redirect.conservation.ca.gov/DLRP/fmmp/county_info_results.asp. Accessed: May 16, 2013.



Altamont Pass Wind Resource Area
Repowering Program

Figure 3.2-1
Farmland Types in the Program Area



Path: K:\Projects_1\County_of_Alameda\00323_08\mapdoc\Fig_3_2_2_WilliamsonAct_20140409.mxd; User: 25110; Date: 4/9/2014

Figure 3.2-2
Williamson Act Lands in the Program Area

3.3 Air Quality

This section describes the regulatory and environmental setting for air quality. It also describes impacts on air quality that would result from implementation of the program and the two individual projects and describes mitigation for significant impacts where feasible and appropriate. Mitigation measures are prescribed where feasible and appropriate.

Greenhouse gas emissions are considered separately from the air quality analysis in this PEIR in Chapter 3.7.

3.3.1 Existing Conditions

The program area is within the San Francisco Bay Area Air Basin (SFBAAB), which encompasses a nine-county region consisting of all of Alameda, Contra Costa, Santa Clara, San Francisco, San Mateo, Marin, and Napa Counties and the southern portions of Solano and Sonoma Counties. Because trucks transporting some components and aggregate would travel from the Port of Stockton and the city of Tracy through portions of the San Joaquin Valley Air Basin (SJVAB) to the program area, the study area also includes the SJVAB.

Regulatory Setting

The air quality management agencies of direct importance in Alameda County are EPA, the California Air Resources Board (ARB), and the Bay Area Air Quality Management District (BAAQMD). EPA has established federal air quality standards for which ARB and BAAQMD have primary implementation responsibility. ARB and BAAQMD are also responsible for ensuring that state air quality standards are met. The San Joaquin Valley Air Pollution Control District (SJVAPCD) has jurisdiction over the SJVAB.

Federal

Clean Air Act and National Ambient Air Quality Standards

The federal Clean Air Act (CAA), promulgated in 1963 and amended several times thereafter, including the 1990 Clean Air Act amendments (CAAA), establishes the framework for modern air pollution control. The Act directs EPA to establish National Ambient Air Quality Standards (NAAQS) for the six criteria pollutants (discussed in Section 3.3.2, *Environmental Setting*). The NAAQS are divided into primary and secondary standards; the former are set to protect human health within an adequate margin of safety, and the latter to protect environmental values, such as plant and animal life. Table 3.3-1 summarizes the NAAQS and the California Ambient Air Quality Standards (CAAQS).

The CAA requires states to submit a state implementation plan (SIP) for areas in nonattainment for federal standards. The SIP, which is reviewed and approved by EPA, must demonstrate how the federal standards would be achieved. Failing to submit a plan or secure approval can lead to denial of federal funding and permits. In cases where the SIP fails to demonstrate achievement of the standards, EPA is directed to prepare a federal implementation plan.

Table 3.3-1. National and State Ambient Air Quality Standards

Criteria Pollutant	Average Time	California Standards	National Standards[a]	
			Primary	Secondary
Ozone	1-hour	0.09 ppm	None[b]	None[b]
	8–hour	0.070 ppm	0.075 ppm	0.075 ppm
Particulate matter (PM10)	24-hour	50 μg/m³	150 μg/m³	150 μg/m³
	Annual mean	20 μg/m³	None	None
Fine particulate matter (PM2.5)	24-hour	None	35 μg/m³	35 μg/m³
	Annual mean	12 μg/m³	12.0 μg/m³	15 μg/m³
Carbon monoxide	8-hour	9.0 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	None
Nitrogen dioxide	Annual mean	0.030 ppm	0.053 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm	None
Sulfur dioxide[c]	Annual mean	None	0.030 ppm	None
	24-hour	0.04 ppm	0.14 ppm	None
	3-hour	None	None	0.5 ppm
	1-hour	0.25 ppm	0.075 ppm	None
Lead	30-day Average	1.5 μg/m³	None	None
	Calendar quarter	None	1.5 μg/m³	1.5 μg/m³
	3-month average	None	0.15 μg/m³	0.15 μg/m³
Sulfates	24-hour	25 μg/m³	None	None
Visibility-reducing particles	8-hour	–[d]	None	None
Hydrogen sulfide	1-hour	0.03 ppm	None	None
Vinyl chloride	24-hour	0.01 ppm	None	None

Source: California Air Resources Board 2013a.

ppm = parts per million.

μg/m³ = micrograms per cubic meter.

[a] National standards are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.

[b] The federal 1-hour standard of 12 parts per hundred million was in effect from 1979 through June 15, 2005. The revoked standard is referenced because it was employed for such a long period and a benchmark for state implementation plans.

[c] The annual and 24-hour NAAQS for SO_2 apply only for one year after designation of the new 1-hour standard to those areas that were previously nonattainment areas for the 24-hour and annual NAAQS.

[d] The CAAQS for visibility-reducing particles is defined by an extinction coefficient of 0.23 per kilometer (visibility of 10 miles or more due to particles when relative humidity is less than 70%).

Clean Air Nonroad Diesel Rule

To reduce emissions from offroad diesel equipment, EPA established a series of increasingly strict emission standards for new engines. Locomotives and marine vessels are exempt from this rule. Manufacturers of offroad diesel engines are required to produce engines meeting certain emission standards based on the model year the engine was manufactured based on the following compliance schedule.

- Tier 1 standards were phased in from 1996 to 2000 (year of manufacture), depending on the engine horsepower category.
- Tier 2 standards were phased in from 2001 to 2006.
- Tier 3 standards were phased in from 2006 to 2008.
- Tier 4 standards, which require add-on emissions-control equipment to attain them, are currently being phased in, from 2008 to 2015.

State

California Clean Air Act and California Ambient Air Quality Standards

In 1988, the state legislature adopted the California Clean Air Act (CCAA), which established a statewide air pollution control program. Unlike the federal CAA, the CCAA does not set precise attainment deadlines. Instead, the CCAA requires all air districts in the state to endeavor to meet the CAAQS by the earliest practical date. Each air district's clean air plan is specifically designed to attain the standards and must be designed to achieve an annual 5% reduction in district-wide emissions of each nonattainment pollutant or its precursors. When an air district is unable to achieve a 5% annual reduction in district-wide emissions of each nonattainment pollutant or its precursors, the adoption of "all feasible measures" on an expeditious schedule is acceptable as an alternative strategy (Health and Safety Code Section 40914(b)(2)). CAAQS are generally more stringent than the NAAQS and incorporate additional standards for SO_4, H_2S, C_2H_3Cl, and visibility-reducing particles. The CAAQS and NAAQS are listed together in Table 3.3-1.

ARB and local air districts bear responsibility for achieving the CAAQSs, which are to be achieved through district-level air quality management plans that would be incorporated into the SIP. In California, EPA has delegated authority to prepare SIPs to ARB, which, in turn, has delegated that authority to individual air districts. ARB traditionally has established state air quality standards, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and approving SIPs.

The CCAA substantially adds to the authority and responsibilities of air districts. The CCAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures. The CCAA also emphasizes the control of "indirect and area-wide sources" of air pollutant emissions. The CCAA gives local air pollution control districts explicit authority to regulate indirect sources of air pollution and to establish traffic control measures (TCMs).

Statewide Truck and Bus Regulation

Originally adopted in 2005, the onroad truck and bus regulation requires heavy trucks to be retrofitted with particulate matter (PM) filters. The regulation applies to privately and federally owned diesel fueled trucks with a gross vehicle weight rating (GWR) greater than 14,000 pounds. Compliance with the regulation can be reached through one of two paths: (1) vehicle retrofits according to engine year, or (2) phase-in schedule. Compliance paths ensure that by January 2023, nearly all trucks and buses will have 2010 model year engines or newer.

State Tailpipe Emission Standards

To reduce emissions from offroad diesel equipment, onroad diesel trucks, and harbor craft, ARB established a series of increasingly strict emission standards for new engines. New construction equipment used for the program, including heavy duty trucks and offroad construction equipment, will be required to comply with the standards.

Toxic Air Containment Regulation

California regulates toxic air containments (TACs) primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). In the early 1980s, ARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Toxic Air Contaminant Identification and Control Act (AB 1807) created California's program to reduce exposure to air toxics. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) supplements the AB 1807 program by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

In August 1998, ARB identified diesel particulate matter (DPM) emissions from diesel-fueled engines as a TAC. In September 2000, ARB approved a comprehensive diesel risk reduction plan to reduce emissions from both new and existing diesel-fueled engines and vehicles (California Air Resources Board 2000). The goal of the plan is to reduce diesel PM10 (respirable particulate matter) emissions and the associated health risk by 75% in 2010 and by 85% by 2020. The plan identifies 14 measures that target new and existing onroad vehicles (e.g., heavy-duty trucks and buses), offroad equipment (e.g., graders, tractors, forklifts, sweepers, and boats), portable equipment (e.g., pumps), and stationary engines (e.g., stand-by power generators). ARB will implement the plan over the next several years. Because the ARB measures are enacted prior to construction, the program would be required to comply with applicable diesel control measures.

The Tanner Act sets forth a formal procedure for ARB to designate substances as TACs. The procedure entails research, public participation, and scientific peer review before ARB designates a substance as a TAC. To date, ARB has identified 21 TACs and has also adopted EPA's list of hazardous air pollutants (HAPs) as TACs. In August 1998, DPM was added to the ARB list of TACs (California Air Resources Board 1998).

The Hot Spots Act requires that existing facilities that emit toxic substances above specified levels complete the following steps.

- Prepare a toxic emission inventory.
- Prepare a risk assessment if emissions are significant (i.e., 10 tons per year or if the toxic substance is on District's Health Risk Assessment [HRA] list).
- Notify the public of significant risk levels.
- Prepare and implement risk reduction measures.

ARB has adopted several regulations that will reduce diesel emissions from in-use vehicles and engines throughout California. For example, ARB adopted an idling regulation for onroad diesel-fueled commercial vehicles in July 2004 and updated it in October 2005. The regulation applies to public and privately owned trucks with a GWR greater than 10,000 pounds. Vehicles subject to the regulation are prohibited from idling for more than 5 minutes in any one location. ARB also adopted a regulation for diesel-powered construction and mining vehicles operating. Fleet owners are subject to retrofit or accelerated replacement/repower requirements for which ARB must obtain authorization from EPA prior to enforcement. The regulation also imposes a 5-minute idling limitation on owners, operators, and renters or lessees of offroad diesel vehicles. In some cases, the particulate matter reduction strategies also reduce smog-forming emissions such as NO_X. As an ongoing process, ARB reviews air contaminants and identifies those that are classified as TACs. ARB also continues to establish new programs and regulations for the control of TACs, including DPMs, as appropriate.

Local

Bay Area Air Quality Management District

BAAQMD has local air quality jurisdiction over projects in Alameda County. BAAQMD's responsibilities include overseeing stationary-source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by CEQA. BAAQMD is also responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws and ensuring that the NAAQS and CAAQS are met.

The BAAQMD rules outlined below may apply to the program. Additional BAAQMD rules may apply as project-specific components are identified.

- **Regulation 2, Rule 2 (New Source Review).** This regulation contains requirements for Best Available Control Technology and emission offsets.
- **Regulation 2, Rule 5 (New Source Review of Toxic Air Contaminants).** This regulation outlines guidance for evaluating TAC emissions and their potential health risks.
- **Regulation 6, Rule 1 (Particulate Matter).** This regulation restricts emissions of PM darker than No. 1 on the Ringlemann Chart to less than 3 minutes in any 1 hour.
- **Regulation 7 (Odorous Substances).** This regulation establishes general odor limitations on odorous substances and specific emission limitations on certain odorous compounds.
- **Regulation 9, Rule 8 (Stationary Internal Combustion Engines).** This regulation limits emissions of NOX and CO from stationary internal combustion engines of more than 50 horsepower.

The Bay Area Air Quality Management District *California Environmental Quality Act Air Quality Guidelines* (BAAQMD Guidelines) provide procedures for assessing air quality impacts and preparing the air quality sections of environmental documents under CEQA. The guidelines identify methodologies for predicting project emissions and impacts and present measures that can be used to avoid or reduce air quality impacts. Also outlined in the BAAQMD Guidelines are advisory emissions thresholds that the district has adopted to help CEQA lead agencies determine whether construction and operational activities associated with projects would have significant adverse environmental impacts (Bay Area Air Quality Management District 2011).

In August 2013, the First District Court of Appeals reversed a lower superior court ruling that the BAAQMD needed to comply with CEQA prior to adopting its 2010 Air Quality Guidelines and significance thresholds, thereby issuing a writ of mandate ordering BAAQMD to set aside the thresholds and cease their dissemination until BAAQMD complied with CEQA. However, the Appellate court ruled that adoption of the guidelines and thresholds is not considered a project subject to CEQA review, and adoption of the significance thresholds was not arbitrary and capricious. As of November 2013, the BAAQMD has yet to formally re-recommend its Air Quality Guidelines and significance thresholds for use by local agencies, but they are now authorized to do so by the Appellate court.

Other air quality plans BAAQMD has adopted include the *Bay Area 2001 Ozone Attainment Plan* (Ozone Plan), aimed at reducing ozone and achieving the NAAQS ozone standard. The ARB prepared a Redesignation Request, Attainment Demonstration, and Maintenance Plan for carbon monoxide (CO) in 1996 that includes strategies to ensure continuing attainment of the NAAQS for CO; this plan was subsequently revised in 1998 and 2004. In 2010, the district also adopted the 2010 Clean Air Plan, which updates the Ozone Plan and provides an integrated, multi-pollutant strategy to improve air quality, protect public health, and protect the climate.

San Joaquin Valley Air Pollution Control District

SJVAPCD is the regional air quality agency with jurisdiction over the SJVAB. Although the program area is located within BAAQMD's jurisdiction, it is assumed that trucks transporting some components and aggregate would travel from the Port of Stockton and the city of Tracy through portions of the SJVAB to the program area. Because the program area is located in the SFBAAB, the SJVAPCD rules and clean air plans would not be applicable to the program. However, in order to disclose air quality impacts within the SJVAB, this analysis includes discussion of potential impacts associated with heavy-duty truck emissions that would be generated within the SJVAB. In addition, because the SJVAB is downwind of the project site some emissions that are emitted at the project site within the SFBAAB would likely drift into the SJVAB through a process known as transport. The ARB has identified the SFBAAB as a transport contributor to the SJVAB (California Air Resources Board 2009). For detailed studies of pollutant transport within California, please refer to http://www.arb.ca.gov/aqd/transport/transport.htm. However, it is extremely difficult and would be speculative to determine the quantity of emissions that will traverse air basin boundaries due to the high variability in wind patterns and local weather. Therefore, these emissions were not estimated. Project emissions that would be generated in the SJVAB are assessed using significance thresholds identified in SJVAPCD's *Guide for Assessing and Mitigating Air Quality Impacts* (San Joaquin Valley Air Pollution Control District 2002).

Alameda County General Plan—East County Area Plan

The ECAP, a part of the Alameda County General Plan, contains air quality goals and policies to address air pollution concerns in the eastern area of the county. The ECAP air quality goal is to "ensure that air pollution levels do not threaten public health and safety, economic development, or future growth" (Alameda County 2000:70). The ECAP was last revised in 2000 by the voter initiative Measure D; however, it did not result in any changes to policies regarding air quality. ECAP policies applicable to the program include those listed below (Alameda County 2000:70–71).

- **Policy 296:** The County shall review the cumulative impact of proposed projects for their potential effect on air quality conditions.
- **Policy 297:** The County shall coordinate air quality planning efforts with other local, regional and state agencies.

- **Policy 300:** The County shall review proposed projects for their potential to generate hazardous air pollutants.
- **Policy 302:** The County shall include buffer zones within new residential and sensitive receptor site plans to separate those uses from freeways, arterials, point sources and hazardous material locations.
- **Policy 303:** The County shall incorporate the provisions of the Association of Bay Area Government's (ABAG) Bay Area Air Quality Plan and the Bay Area Air Quality Management District's (BAAQMD) Air Quality and Urban Development Guidelines into project review procedures.
- **Policy 304:** The County shall notify cities and the Bay Area Air Quality Management District (BAAQMD) of proposed projects which may significantly affect air quality.

Environmental Setting

Regional Topography, Meteorology, and Climate

The topography of the program area is dominated by northwest-southeast-trending ridge lines that reach an elevation of approximately 800 to 1,400 feet above mean sea level (msl). The elevations of intervening valley bottoms in the program area are from approximately 400 to 800 feet above msl. The climate of the SFBAAB is determined largely by a high-pressure system that is almost always present over the eastern Pacific Ocean off the west coast of North America. High pressure systems are characterized by an upper layer of dry air that warms as it descends, which restricts the mobility of cooler marine-influenced air near the ground surface and results in the formation of subsidence inversions. During the winter, the Pacific high-pressure system shifts southward, thereby allowing storms to pass through the region. During summer and fall, emissions generated within the SFBAAB can combine with abundant sunshine under the restraining influences of topography and subsidence inversions to create conditions that are conducive to the formation of photochemical pollutants, such as ozone.

The program area is generally well-ventilated by winds. Winter prevailing wind directions span the north-northeast through east-northeast sectors, caused by drainage off of the hills and flow out of the Altamont Pass. During the summer months, cold water upwelling along the coast and hot inland temperatures can cause a strong onshore pressure gradient that translates into a strong, afternoon wind. BAAQMD operates a regional air quality monitoring network; the closest station to the program area is the Livermore Monitoring Station on Rincon Avenue in the City of Livermore, which is approximately 9 miles to the south-southwest. In Livermore, over 70% of the wind is from the south-southwest to west-southwest, and by the afternoon, 35% of the wind speed is about 11 miles per hour (mph). However, the program area tends to be a receptor of ozone and ozone precursors from San Francisco, Alameda, western and northern Contra Costa County, and Santa Clara County and, during the summer months, temperatures tend to be warm, which promotes the formation of ozone (Bay Area Air Quality Management District 2010). In turn, the SJVAB and the Central Valley in general that is downwind of the program area also is a receptor of these same pollutants, accumulating with emissions from the Tri-Valley area and to some degree northern Contra Costa County and southern Solano County. The ARB has identified the SFBAAB as a transport contributor to the Sacramento region, the Mountain Counties Air Basin, the North Central Coast Air Basin, the North Coast Air Basin, the San Joaquin Valley Air Basin, and the South Central Coast Air Basin (California Air Resources Board 2010).

Temperature and precipitation data collected in Livermore indicate that the program area typically has average maximum and minimum winter (i.e., January) temperatures of 57 and 37 degrees Fahrenheit (°F), respectively, while average summer (i.e., July) maximum and minimum temperatures are 89 and 54 °F, respectively. Precipitation in the program area averages approximately 14 inches per year (Western Regional Climate Center 2013).

Air Pollutants of Concern

The federal government has established NAAQS, and the state has established CAAQS, respectively, for six criteria pollutants: ozone, CO, lead (Pb), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and PM.

Ozone and NO_2 are considered regional pollutants because they (or their precursors) affect air quality on a regional scale; NO_2 reacts photochemically with reactive organic gases (ROGs) to form ozone, and this reaction occurs at some distance downwind of the source of pollutants. Pollutants such as CO, SO_2, and Pb are considered to be local pollutants that tend to accumulate in the air locally. PM is considered to be a local as well as a regional pollutant.

The primary pollutants of concern in the study area are ozone (including nitrogen oxides [NO_X]), CO, and PM. Principal characteristics surrounding these pollutants are discussed below. TACs are also discussed, although no air quality standards exist for these pollutants.

Ozone

Ozone is a respiratory irritant that can cause severe ear, nose, and throat irritation and increase susceptibility to respiratory infections. It is also an oxidant that can cause extensive damage to plants through leaf discoloration and cell damage. It can cause substantial damage to other materials as well, such as synthetic rubber and textiles.

Ozone is not emitted directly into the air but is formed by a photochemical reaction in the atmosphere. Ozone precursors—ROG and NO_X—react in the atmosphere in the presence of sunlight to form ozone. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer air pollution problem. The ozone precursors, ROG and NO_X, are mainly emitted by mobile sources and by stationary combustion equipment.

Hydrocarbons are organic gases that are made up of hydrogen and carbon atoms. There are several subsets of organic gases, including ROGs and volatile organic compounds (VOCs). ROGs are defined by state rules and regulations; VOCs are defined by federal rules and regulations. For the purposes of this assessment, hydrocarbons are classified and referred to as ROGs. Both ROGs and VOCs are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels or as a product of chemical processes. The major sources of hydrocarbons are combustion engine exhaust, oil refineries, and oil-fueled power plants; other common sources are petroleum fuels, solvents, dry-cleaning solutions, and paint (through evaporation).

The health effects of hydrocarbons result from the formation of ozone. High levels of hydrocarbons in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen though displacement. Carcinogenic forms of hydrocarbons are considered TACs. There are no separate health standards for ROGs, although some are also toxic; for example, benzene is both a ROG and a carcinogen.

Nitrogen Oxides

Nitrogen oxides are a family of highly reactive gases that are a primary precursor to the formation of ground-level ozone and react in the atmosphere to form acid rain. Nitrogen dioxide, often used interchangeably with NO_X, is a brownish, highly reactive gas that is present in all urban environments. The major human sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2 (U.S. Environmental Protection Agency 2013a). The combined emissions of NO and NO_2 are referred to as NO_X and reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with ozone, the NO_2 concentration in a particular geographical area may not be representative of local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects primarily depends on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, such as coughing, difficulty breathing, vomiting, headache, and eye irritation during or shortly after exposure. After a period of approximately 4 to 12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe symptomatic NO_2 intoxication after acute exposure has been linked to prolonged respiratory impairment, with such symptoms as emphysema, bronchitis, and aggravating existing heat disease (U.S. Environmental Protection Agency 2013b).

Carbon Monoxide

Carbon Monoxide (CO), a colorless and odorless gas, interferes with the transfer of oxygen to the brain. It can cause dizziness and fatigue and can impair central nervous system functions. CO is emitted almost exclusively from the incomplete combustion of fossil fuels. In urban areas, motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains emit CO. Automobile exhaust releases most of the CO in urban areas. CO is a nonreactive air pollutant that dissipates relatively quickly, so ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions—primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, a typical situation at dusk in urban areas between November and February. Because motor vehicles are the dominant source of CO emissions, CO hotspots are normally located near roads and freeways with high traffic volume.

Particulate Matter

Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. PM also forms when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. Particulate matter less than 10 microns in diameter, about 1/7 the thickness of a human hair, is referred to as PM10. Particulate matter that is 2.5 microns or less in diameter, roughly 1/28 the diameter of a human hair, is referred to as PM2.5. Major sources of PM10 include motor vehicles; wood burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. PM2.5 results from fuel combustion (from motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, PM10 and PM2.5 can be formed in the atmosphere from gases such as SO_2, NO_X, and VOCs.

PM10 and PM2.5 pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. PM10 and PM2.5 can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances, such as lead, sulfates, and nitrates, can cause lung damage directly. These substances can be absorbed into the blood stream and cause damage elsewhere in the body; they can also transport absorbed gases such as chlorides or ammonium into the lungs and cause injury. Whereas particles 2.5 to 10 microns in diameter tend to collect in the upper portion of the respiratory system, particles 2.5 microns or less are so tiny that they can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, and contribute to haze and reduce regional visibility.

Toxic Air Contaminants

Although NAAQS and CAAQS exist for criteria pollutants, no ambient standards exist for TACs. Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or other acute (short-term) or chronic (long-term) health problems. For TACs that are known or suspected carcinogens, ARB has consistently found that there are no levels or thresholds below which exposure is risk free. Individual TACs vary greatly in the risks they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than another. For certain TACs, a unit risk factor can be developed to evaluate cancer risk. For acute and chronic health effects, a similar factor, called a Hazard Index, is used to evaluate risk. TACs are identified and their toxicity is studied by the California Office of Environmental Health Hazard Assessment (OEHHA). Examples of TAC sources include industrial processes, dry cleaners, gasoline stations, paint and solvent operations, and fossil fuel combustion sources.

Sulfur Oxides

Sulfur oxides are any of several compounds of sulfur and oxygen, of which the most relevant to air quality is SO_2. SO_2 is a respiratory irritant that causes the bronchioles to constrict with inhalation at 5 parts per million (ppm) or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis. SO_2 is produced by coal and oil combustion and such stationary sources as steel mills, refineries, and pulp and paper mills.

Lead

Lead (Pb) is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it persists forever. Lead was used several decades ago to increase the octane rating in automotive fuel; therefore, gasoline-powered automobile engines were a major source of airborne lead. Since the use of leaded fuel has been mostly phased out, the ambient concentrations of lead have dropped dramatically.

Short-term exposure to high levels of lead can cause vomiting, diarrhea, convulsions, coma, or even death. However, even small amounts of lead can be harmful, especially to infants, young children, and pregnant women. Lead exposure is most serious for young children because they absorb lead more easily than adults and are more susceptible to its harmful effects. Even low-level exposure may harm the intellectual development, behavior, size, and hearing of infants. During pregnancy, especially in the last trimester, lead can adversely affect the fetus. Female workers exposed to high levels of lead have more miscarriages and stillbirths.

Symptoms of long-term exposure to lower lead levels may be less noticeable but are still serious. Anemia is common, and damage to the nervous system may cause impaired mental function. Other symptoms are appetite loss, abdominal pain, constipation, fatigue, sleeplessness, irritability, and headache. Continued excessive exposure, as in an industrial setting, can affect the kidneys.

Diesel Particulate Matter

In 1998, ARB identified DPM as a toxic air contaminant (California Air Resources Board 1998). On a statewide basis, the average potential cancer risk associated with DPM is more than 500 potential cases per million people. The OEHHA estimated the potential cancer risk from a 70-year exposure to DPM at a concentration of 1 microgram per cubic meter ($\mu g/m^3$) ranges from 130 to 2,400 excess cancer cases per million people. A scientific review panel concluded that an appropriate point estimate of unit risk for a 70-year exposure to DPM is 300 excess cancer cases per million people (California Air Resources Board 2000).

The DPM of greatest health concern are those in the categories of fine (PM10) and ultra-fine (PM2.5). These fine and ultra-fine particles may be composed of elemental carbon with adsorbed compounds, such as organic compounds, sulfate, nitrate, metals, and other trace elements. The fine and ultra-fine particles are respirable, which means that they can avoid many of the human respiratory system defense mechanisms and enter deeply into the lungs.

Existing Air Quality Conditions

Existing air quality conditions in the study area can be characterized by monitoring data collected in the region. Though the Livermore–793 Rincon Avenue monitoring station is the closest station to the program area, this monitoring station does not report CO or PM10 conditions in the area. The closest monitoring station to monitor CO is the Fremont–Chapel Way monitoring station located approximately 20 miles west and mostly upwind of the program area. The closest monitoring station to monitor PM10 is the Tracy–Airport monitoring station located approximately 12 miles east of the program area in San Joaquin County. Recent air quality monitoring results from these stations are summarized in Table 3.3-2. The data represent air quality monitoring for the last 3 years for which a complete dataset is available (2010–2012). As indicated in Table 3.3-2, there have been some violations of state and federal air quality standards during this time period for ozone and PM2.5.

Table 3.3-2. Summary of 2010-2012 Ambient Air Quality in the Program Area Vicinity

Pollutant Standards	2010	2011	2012
Ozone (O_3)—Livermore – 795 Rincon Avenue			
Maximum 1-hour concentration (ppm)	0.150	0.115	0.102
Days exceeding[a] the CAAQS 1-hour standard (>0.09 ppm)	3	3	2
Maximum 8-hour concentration (ppm)	0.098	0.085	0.090
Days exceeding[a] the CAAQS 8-hour (>0.070 ppm)	6	9	4
Days exceeding[a] the NAAQS 8-hour (>0.075 ppm)	3	2	3
Carbon monoxide (CO)—Fremont – Chapel Way			
Maximum 8-hour concentration (ppm)	0.94	–	–
Days exceeding[a] the NAAQS 8-hour (≥9 ppm)	0	0	0
Days exceeding[a] the CAAQS 8-hour (≥9.0 ppm)	0	0	0
Nitrogen Dioxide (NO_2)—Livermore – 795 Rincon Avenue			
State maximum 1-hour concentration (ppm)	0.058	0.057	0.043
Annual average concentration (ppm)	0.011	0.011	–
Days exceeding[a] the CAAQS 1-hour (0.18 ppm)	0	0	0
Particulate matter (PM10)—Tracy – Airport			
National[b] maximum 24-hour concentration (μg/m^3)	28.5	110.8	73.4
State[c] maximum 24-hour concentration (μg/m^3)	–	–	–
Days exceeding[a] the NAAQS 24-hour (>150 μg/m^3)[g]	0	0	0
Days exceeding[a] the CAAQS 24-hour (>50 μg/m^3)[g]	–	–	–
Particulate matter (PM2.5)—Livermore – 795 Rincon Avenue			
National[b] maximum 24-hour concentration (μg/m^3)	34.7	45.4	31.1
State[c] maximum 24-hour concentration (μg/m^3)	34.7	23.6	–
Days exceeding[a] the NAAQS 24-hour (>35 μg/m^3)	0	2	0

Source: California Air Resources Board 2013b.

ppm = parts per million.
CAAQS = California Ambient Air Quality Standards.
NAAQS = National Ambient Air Quality Standards.
μg/m^3 = micrograms per cubic meter.
– = data not available.

[a] An exceedance is not necessarily a violation. This is a mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored. Values have been rounded.

[b] Measurements usually are collected every 6 days.

[c] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

Attainment Status

Local monitoring data (Table 3.3-2) are used to designate areas as nonattainment, maintenance, attainment, or unclassified for the NAAQS and CAAQS. The four designations are defined as follows.

- **Nonattainment**—assigned to areas where monitored pollutant concentrations consistently violate the standard in question.
- **Maintenance—**assigned to areas where monitored pollutant concentrations exceeded the standard in question in the past but are no longer in violation of that standard.
- **Attainment**—assigned to areas where pollutant concentrations meet the standard in question over a designated period of time.
- **Unclassified**—assigned to areas were data are insufficient to determine whether a pollutant is violating the standard in question.

Table 3.3-3 summarizes the attainment status of Alameda County with regard to the NAAQS and CAAQS. Table 3.3-4 summarizes the attainment status of the SJVAB with regard to the NAAQS and CAAQS (San Joaquin Valley Air Pollution Control District 2013).

Table 3.3-3. Federal and State Attainment Status for Alameda County

Criteria Pollutant	Federal Designation	State Designation
O_3 (1-hour)	(No federal standard)[a]	Serious Nonattainment
O_3 (8-hour)	Marginal Nonattainment (2008)	Nonattainment
CO	Maintenance	Attainment
PM10	Attainment	Nonattainment
PM2.5	Nonattainment (2006)	Nonattainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
Lead	Attainment (2008)	Attainment
Sulfates	(No Federal Standard)	Attainment
Hydrogen sulfide	(No Federal Standard)	Unclassified
Visibility	(No Federal Standard)	Unclassified

Sources: California Air Resources Board 2011; U.S. Environmental Protection Agency 2012.

O_3 = ozone.
CO = carbon monoxide.
PM10 = particulate matter less than or equal to 10 microns.
PM2.5 = particulate matter less than or equal to 2.5 microns.
NO_2 = nitrogen dioxide.
SO_2 = sulfur dioxide.

[a] The federal 1-hour standard of 12 parts per hundred million (pphm) was in effect from 1979 through June 15, 2005. The revoked standard is referenced here because it was employed for such a long period and because this benchmark is addressed in the state implementation plans.

Table 3.3-4. Federal and State Attainment Status for San Joaquin Valley

Criteria Pollutant	Federal Designation	State Designation
O_3 (1-hour)	(No Federal Standard)	Severe Nonattainment
O_3 (8-hour)	Extreme Nonattainment	Nonattainment
CO	Attainment	Attainment
PM10	Attainment	Nonattainment
PM2.5	Nonattainment (2006)	Nonattainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
Lead	No Designation	Attainment
Sulfates	(No Federal Standard)	Attainment
Hydrogen sulfide	(No Federal Standard)	Unclassified
Visibility	(No Federal Standard)	Unclassified

O_3 = ozone.
CO = carbon monoxide.
PM10 = particulate matter less than or equal to 10 microns.
PM2.5 = particulate matter less than or equal to 2.5 microns.
NO_2 = nitrogen dioxide.
SO_2 = sulfur dioxide.

Sensitive Receptors

For the purposes of air quality analysis, sensitive land uses are defined as locations where human populations, especially children, seniors, and sick persons are located and where there is reasonable expectation of continuous human exposure according to the averaging period for the air quality standards (e.g., 24-hour, 8-hour, and 1-hour). Typical sensitive receptors include residences, hospitals, and schools. While the program area is located in the rural setting of the Altamont Pass, sensitive receptors in the program area vicinity include scattered residences throughout and adjacent to the program area. As indicated in Chapter 2 of this PEIR, *Program Description*, Alameda County has established setback requirements for siting turbines within certain types of land uses (e.g., residential, commercial, recreational), and infrastructure (public roads), and turbines would not be located within these setback distances. Outside the program area, approximately 4,500 feet to the west of the program area is a community of single family residences in the city of Livermore, and 5,000 feet to the east is the community of Mountain House, which contains single family residences, three elementary schools and childcare facilities, and public parks and open spaces.

3.3.2 Environmental Impacts

Methods for Analysis

Criteria pollutant emissions were estimated for construction and operational activities at a programmatic level with additional detail given to two specific repowering projects, the Golden Hills and Patterson Pass Projects, which fall within the program area. Emissions were calculated for a typical 80 MW repowering project using project data from the *Vasco Winds Repowering Project Draft Environmental Impact Report* (Contra Costa County 2010). This was done because project-specific information for the proposed projects was very limited, and the repowering activities are not yet determined. Because the Vasco example provides a comprehensive analysis of typical construction activity for repowering, it was used to estimate total and daily emissions for the proposed projects, as it is considered representative of a typical project associated with the program. Total emissions from the Vasco example were then scaled to the program and the Golden Hills and Patterson Pass Projects based on the nameplate capacity of the program area. The scaling factors for total construction emissions are as follows: 5.21 for program Alternative 1: 417 MW (416.5 MW nameplate capacity ÷ 80 MW metric nameplate capacity); 5.63 for program Alternative 2: 450 MW (450 MW nameplate capacity ÷ 80 MW metric nameplate capacity); 1.11 for the Golden Hills Project (88.4 MW nameplate capacity ÷ 80 MW metric nameplate capacity); and 0.25 for the Patterson Pass Project (19.8 MW nameplate capacity ÷ 80 MW metric nameplate capacity). Annual construction emissions from the Vasco example were also scaled to the program and the Golden Hills and Patterson Pass Projects using a maximum annual nameplate capacity of 100 MW installed. This produces a scaling factor of 1.25 to estimate annual emissions from both Alternative 1 and Alternative 2 (100 MW maximum ÷ 80 MW metric nameplate capacity). Since the nameplate capacity of the Golden Hills and Patterson Pass Projects are less than 100MW, it was assumed that all emissions from these projects would occur during one calendar year**.**

Construction emissions were estimated for each phase of construction for three major contributors: offroad equipment, onroad vehicles (including truck trips and worker commutes), and concrete batch plant operations. Calculation methods from the following sources were used to estimate emissions: the California Emissions Estimator Model (CalEEMod) (South Coast Air Quality Management District 2011), the EPA Emissions Factors & AP 42 Compilation of Air Pollutant Emission Factors document (U.S. Environmental Protection Agency 1995a, 1995b, 1995c), and the ARB EMission FACtors (EMFAC) 2011 model (California Air Resources Board 2013c). Additional standard emission factors, conversion factors, and methods were used to estimate emissions per standard air quality protocol consistent with BAAQMD guidance.

Operational emissions were estimated for offroad equipment (maintenance/operation activities) and onroad vehicles (including truck trips and worker commutes). Calculation methods from the same sources as listed above for construction emissions were used to estimate operational emissions.

The concrete batch plant would produce fugitive dust emissions during the manufacture of concrete. Approximately 0.0157 pounds of PM10 would be emitted per cubic yard of concrete produced (U.S. Environmental Protection Agency 1995c). It was assumed that PM2.5 represents 0.674% of PM10 (South Coast Air Quality Management District 2006). Stationary source emissions from fuel combustion at the batch plants were not estimated because specific data on the types of equipment (generators, engines, etc.) that would be used at the batch plants were not available. In addition, the batch plants are permitted sources under BAAQMD and emissions would be minor after required air district Best Available Control Technologies (BACTs) and offsets.

Important assumptions (associated with the 80 MW project example) used in the analysis are presented below.

- Emissions were estimated for a typical 80 MW repowering project and scaled to the program, Golden Hills Project, and Patterson Pass Project based on the nameplate capacity of the program area and the two project areas.

- For the program alternatives, the maximum annual nameplate capacity installed is 100 MW. This produces a scaling factor of 1.25 for emissions from the 80 MW project Vasco example to estimate annual emissions from both Alternative 1 and Alternative 2.
- Offroad equipment types, fuel types, and phasing (days of construction for each construction phase for each month of the year) for construction and operational activities were taken from the *Vasco Winds Repowering Project Draft Environmental Impact Report* (Contra Costa County 2010).
- Construction activity will occur 8 hours per day, 5 days per week.
- Fugitive dust emissions from grading are calculated for graders and bulldozers using CalEEMod methods, which calculate emissions on a per-mile basis for graders and a per-hour basis for bulldozers. Each grader travels at an average speed of 7.1 mph with a blade width of 12 feet to cover 292 total acres for a total mileage of grading of 201 miles (8.3 miles average per day). Each bulldozer operates 8 hours per day during construction.
- There will be 10,800 annual (55 average daily) light-duty truck trips, 16,605 annual (85 average daily) heavy-duty truck trips for material delivery and removal, and 6,338 annual (33 average daily) heavy-duty truck trips for water delivery (water tankers).
- Each light-duty trip will include 1.0 mile of 15 mph travel (ridge line), 1.0 mile of 25 mph travel (access roads), and 23 miles of 55 mph travel (freeway), for a total roundtrip distance of 25 miles.
- Each heavy-duty trip will include 5.0 miles of 15 mph travel (ridge line), 1.0 mile of 25 mph travel (access roads), and 29 miles of 55 mph travel (freeway) for a total roundtrip distance of 35 miles. Each water tanker truck trip would include 6.0 miles of 15 mph travel (ridge line), 1.0 mile of 25 mph travel (access roads), and 19 miles of 55 mph travel (freeway), for a total roundtrip distance of 26 miles.
- Worker commute roundtrips are 25 miles; worker vehicles travel at an average of 55 mph. There will be 16,790 annual (86 average daily and 150 maximum daily) worker commute trips for construction and 2,226 annual (8.5 average daily) worker commute trips for operation.
- Approximately 3,500 cubic yards of concrete will be produced at the concrete batch plants per year (55 cubic yards on average per day).

Determination of Significance

In accordance with Appendix G of the State CEQA Guidelines, program Alternative 1, program Alternative 2, the Golden Hills project, or the Patterson Pass project would be normally considered to have a significant effect if it would result in any of the conditions listed below.

- Conflict with or obstruct implementation of the applicable air quality plan.
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the program or project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).

- Expose sensitive receptors to substantial pollutant concentrations.
- Create objectionable odors affecting a substantial number of people

According to the State CEQA Guidelines, the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make significance determinations for potential impacts on environmental resources. Consequently, the analysis used in this document uses methodologies provided in the updated BAAQMD Guidelines (Bay Area Air Quality Management District 2012). Although the 2010 BAAQMD Guidelines and their 2011 update have been challenged in court, and BAAQMD has removed all references of the 2010/2011 adopted thresholds from the 2012 BAAQMD Guidelines, the 2010/2011 BAAQMD Guidelines contain quantitative significance thresholds for project-related construction exhaust emissions and operational emissions. Because the 2010/2011 thresholds are more stringent and comprehensive than the 1999 thresholds (as recommended for use in the 2012 BAAQMD Guidelines), the 2010/2011 thresholds are used to determine significance for construction and operational activities (Bay Area Air Quality Management District 2011). There are no quantitative thresholds for construction impacts associated with fugitive dust, so these impacts are addressed using applicable BAAQMD-recommended mitigation measures for dust abatement.

Under the 2010/2011 BAAQMD thresholds, a project would have a significant short-term construction-related or long-term operational air quality impact if it would exceed BAAQMD's thresholds shown in Table 3.3-5.

Table 3.3-5. BAAQMD Thresholds of Significance

Pollutant	Construction	Operations
ROG	54 lbs/day	54 lbs/day or 10 tons/year
NO_X	54 lbs/day	54 lbs/day or 10 tons/year
CO	–	Violation of CAAQS
PM10 (total)	–	–
PM10 (exhaust)	82 lbs/day	82 lbs/day or 15 tons/year
PM2.5 (exhaust)	54 lbs/day	54 lbs/day or 10 tons/year
PM10/PM2.5 (fugitive dust)	BMPs	–
TACs (project-level)	Increased cancer risk of 10 in 1 million; increased non-cancer risk of greater than 1.0 (hazard index [HI]); PM2.5 increase of greater than 0.3 micrograms per cubic meter	Same as construction
TACs (cumulative)	Increased cancer risk of 100 in 1 million; increased non-cancer risk of greater than 10.0; PM2.5 increase of greater than 0.8 microgram per cubic meter at receptors within 1,000 feet	Same as construction
Odors	–	Five complaints per year averaged over 3 years

Source: Bay Area Air Quality Management District 2011.
lbs = pounds.
CAAQS = California Ambient Air Quality Standards.
BMPs = best management practices.

Both average daily and maximum daily emissions were calculated for the project, and maximum daily emissions were compared to the daily thresholds listed in Table 3.3-5, per the recommendation of BAAQMD staff (Kirk pers. comm.).

For projects that would result in an increase in ROG, NO_X, PM10, or PM2.5 of more than their respective project-level daily mass thresholds indicated in Table 3.3-5, then it would also be considered to contribute considerably to a significant cumulative impact. In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. Therefore, if a project would exceed the project-level significance thresholds identified in Table 3.3-5, its emissions would be cumulatively considerable; if a project would not exceed the significance thresholds, its emissions would not be cumulatively considerable.

In addition to emissions that would be generated in BAAQMD's jurisdiction, the portion of equipment and material haul trips that would originate at the Port of Stockton and in the city of Tracy would be generated in the SJVAB, which is under SJVAPCD's jurisdiction. Therefore, the heavy-duty truck trip exhaust emissions that would be generated in the SJVAB have been quantified. In addition, the SJVAB is downwind of the project site and may receive some emissions that are emitted at the project site within the SFBAAB due to transport. However, it is extremely difficult and would be speculative to determine the quantity of emissions that will traverse air basin boundaries due to the high variability in wind patterns and local weather. Therefore, these emissions were not estimated nor compared to the SJVAPCD's thresholds.

SJVAPCD's published guidelines, *Guide for Assessing Air Quality Impacts* (San Joaquin Valley Air Pollution Control District 2002), do not require the quantification of construction emissions. Rather, it requires implementation of effective and comprehensive feasible control measures to reduce PM10 emissions (San Joaquin Valley Air Pollution Control District 2002). SJVAPCD considers PM10 emissions to be the greatest pollutant of concern when assessing construction-related air quality impacts and has determined that compliance with its Regulation VIII, including implementation of all feasible control measures specified in its guidance manual (San Joaquin Valley Air Pollution Control District 2002), constitutes sufficient mitigation to reduce construction-related PM10 emissions to less-than-significant levels and minimize adverse air quality effects. All construction projects must abide by Regulation VIII. Since the publication of the district's guidance manual, the district has revised some of the rules comprising Regulation VIII. Guidance from district staff indicates that implementation of a dust control plan would satisfy all of the requirements of Regulation VIII (Siong pers. comm.). Further consultation with SJVAPCD staff indicates that, though explicit thresholds for construction-related emissions of ozone precursors are not enumerated in the guidance manual, SJVAPCD considers a significant impact to occur when construction emissions of ROG or NO_X exceed 10 tons per year or if PM10 or PM2.5 emissions exceed 15 tons per year (Siong pers. comm.).

SJVAPCD's thresholds of significance used in this analysis, as indicated in its *Guide for Assessing and Mitigating Air Quality Impacts* (San Joaquin Valley Air Pollution Control District 2002) and through consultation with SJVAPCD staff, are summarized below.

- Project implementation would produce emissions increases greater than 10 tons/year ROG.
- Project implementation would produce emissions increases greater than 10 tons/year NO_X.
- Project implementation would produce emissions increases greater than 15 tons/year PM10.

- Project implementation would produce emissions increases greater than 15 tons/year PM2.5

SJVAPCD does not have established quantitative CEQA thresholds for construction activities. Therefore, in lieu of CEQA significance thresholds for construction emissions, estimated emissions that would be generated by the proposed projects under the program in the SJVAB are compared to SJVAPCD's operational CEQA threshold of 10 tons per year for both NO_X and ROG and 15 tons per year for both PM10 and PM2.5 (San Joaquin Valley Air Pollution Control District 2002). Under the SJVAPCD thresholds, a project would have a significant short-term construction-related or long-term operational air quality impact if it would exceed SJVAPCD's thresholds shown in Table 3.3-6.

Table 3.3-6. SJVAPCD Thresholds of Significance

Pollutant	Construction	Operations
ROG	–	10 tons/year
NO_X	–	10 tons/year
CO	–	Violation of CAAQS
PM10 (total)	–	15 tons/year
PM2.5 (total)	–	15 tons/year

Sources: San Joaquin Valley Air Pollution Control District 2002; Siong pers. comm.
CAAQS = California Ambient Air Quality Standards.

Impacts and Mitigation Measures

Impact AQ-1a-1: Conflict with or obstruct implementation of the applicable air quality plan—program Alternative 1: 417 MW (less than significant)

In order to determine that a project is consistent with the applicable air quality plan, which in this case is the *Bay Area 2010 Clean Air Plan* (Bay Area 2010 CAP), it is necessary to demonstrate that program Alternative 1 does not exceed the population or employment growth assumptions contained in the plan, which would lead to increased vehicle miles traveled beyond those estimated in the plan. Implementation of Alternative 1 would result in no new permanent employees relative to existing conditions, nor would it increase population projections. Therefore, Alternative 1 would not induce population or employment growth and would result in no net increase in vehicle miles traveled in the SFBAAB. Alternative 1's potential impacts on population and housing are discussed in Chapter 3.12, *Population*; potential transportation-related impacts are discussed in Section 3.16, *Traffic*.

In addition, although short-term mitigated emissions resulting from Alternative 1 construction would exceed the BAAQMD significance thresholds for ROG and NO_X (see Impact AQ-2a-1), Alternative 1 would result in long-term benefits from new renewable wind-generated energy, including reduction of ROG and NO_X emissions relative to the production of comparable energy from fossil fuel sources. Thus, Alternative 1 would be consistent with the Bay Area 2010 CAP regardless of this short-term impact.

It is assumed that trucks transporting some components and aggregate would travel from the Port of Stockton and the city of Tracy through portions of the SJVAB to the program area. However, SJVAPCD rules and clean air plans would not be applicable to Alternative 1 because the program area is located in the SFBAAB. Therefore, no conflict with SJVAPCD clean air plans would occur.

This impact would be less than significant. No mitigation is required.

Impact AQ-1a-2: Conflict with or obstruct implementation of the applicable air quality plan—program Alternative 2: 450 MW (less than significant)

In order to determine that a project is consistent with the applicable air quality plan, which in this case is the *Bay Area 2010 Clean Air Plan* (Bay Area 2010 CAP), it is necessary to demonstrate that program Alternative 2 does not exceed the population or employment growth assumptions contained in the plan, which would lead to increased vehicle miles traveled beyond those estimated in the plan. Implementation of Alternative 2 would result in no new permanent employees relative to existing conditions, nor would it increase population projections. Therefore, Alternative 2 would not induce population or employment growth and would result in no net increase in vehicle miles traveled in the SFBAAB. Alternative 2's potential impacts on population and housing are discussed in Chapter 3.12, *Population*; potential transportation-related impacts are discussed in Section 3.16, *Traffic*.

In addition, although short-term mitigated emissions resulting from Alternative 2 construction would exceed the BAAQMD significance thresholds for ROG and NO_X (see Impact AQ-2a-2), Alternative 2 would result in long-term benefits from new renewable wind-generated energy, including reduction of ROG and NO_X emissions relative to the production of comparable energy from fossil fuel sources. Thus, Alternative 2would be consistent with the Bay Area 2010 CAP regardless of this short-term impact.

It is assumed that trucks transporting some components and aggregate would travel from the Port of Stockton and the city of Tracy through portions of the SJVAB to the program area. However, SJVAPCD rules and clean air plans would not be applicable to Alternative 2because the program area is located in the SFBAAB. Therefore, no conflict with SJVAPCD clean air plans would occur.

This impact would be less than significant. No mitigation is required.

Impact AQ-1b: Conflict with or obstruct implementation of the applicable air quality plan—Golden Hills Project (less than significant)

The impact for the Golden Hills Project is similar to that of the program. Implementation of the Golden Hills Project would result in no new permanent employees relative to existing conditions, nor would it increase population projections. Therefore, the Golden Hills Project would not induce population or employment growth and would result in no net increase in vehicle miles traveled in the SFBAAB. The Golden Hills Project's potential impacts on population and housing are discussed in Chapter 3.12, *Population*; potential transportation-related impacts are discussed in Section 3.16, *Traffic*.

In addition, although short-term mitigated emissions resulting from Golden Hills Project construction would exceed the BAAQMD significance threshold for NO_X (see Impact AQ-2b), the Golden Hills Project would result in long-term benefits from new renewable wind-generated energy, including reduction of NO_X emissions relative to the production of comparable energy from fossil fuel sources. Thus, the Golden Hills Project would be consistent with the Bay Area 2010 CAP regardless of this short-term impact.

It is assumed that trucks transporting some components and aggregate would travel from the Port of Stockton and the city of Tracy through portions of the SJVAB to the project area. However, SJVAPCD rules and clean air plans would not be applicable to the proposed project because the project area is located in the SFBAAB. Therefore, no conflict with SJVAPCD clean air plans would occur.

This impact would be less than significant. No mitigation is required.

Impact AQ-1c: Conflict with or obstruct implementation of the applicable air quality plan—Patterson Pass Project (less than significant)

The impact for the Patterson Pass Project is similar to that of the program. Implementation of the Patterson Pass Project would result in no new permanent employees relative to existing conditions, nor would it increase population projections. Therefore, the Patterson Pass Project would not induce population or employment growth and would result in no net increase in vehicle miles traveled in the SFBAAB. The Patterson Pass Project's potential impacts on population and housing are discussed in Chapter 3.12, *Population*; potential transportation-related impacts are discussed in Section 3.16, *Traffic*.

In addition, although short-term mitigated emissions resulting from Patterson Pass Project construction would exceed the BAAQMD significance threshold for NO_X (see Impact AQ-2c), the Patterson Pass Project would result in long-term benefits from new renewable wind-generated energy, including reduction of NO_X emissions relative to the production of comparable energy from fossil fuel sources. Accordingly, the Patterson Pass Project would be consistent with the Bay Area 2010 CAP regardless of this short-term impact.

It is assumed that trucks transporting some components and aggregate would travel from the Port of Stockton and the city of Tracy through portions of the SJVAB to the project area. However, SJVAPCD rules and clean air plans would not be applicable to the proposed project because the project area is located in the SFBAAB. Therefore, no conflict with SJVAPCD clean air plans would occur.

This impact would be less than significant. No mitigation is required.

Impact AQ-2a-1: Violate any air quality standard or contribute substantially to an existing or projected air quality violation—program Alternative 1: 417 MW (significant and unavoidable)

Construction Activities

Based on the assumptions presented above, construction of the various projects under the program would occur over a period of 9 months per year for approximately 4 years. It is estimated that there would be approximately 184 workdays per year that would involve the use of heavy construction equipment. Construction activities at the program area would be associated with decommissioning and foundation removal of existing turbine sites; laydown, substations, and switch yards; road construction; turbine foundations and batch plant operation; turbine delivery and installation; utility collector line installation; and restoration and clean-up. Each of these activities would occur over periods that would range from approximately 2 to 4 months. It is estimated that as many as 90 pieces of offroad construction equipment, including cranes, excavators, graders, loaders, cement trucks, and dozers, would be required for an average of 8 hours per day to construct various projects under the program. At any given time, from 6 to 54 pieces of construction equipment would be operating concurrently, depending on the construction phasing.

In addition to the offroad equipment, onroad vehicle trips would be required to deliver materials and equipment to the construction sites as well as to transport workers to and from the construction sites (see Chapter 2, *Program Description*, *Traffic and Parking* section). It is anticipated that an average of approximately 140 truck trips and 86 commuting worker trips would be required per day during the 9-month construction period for each year. It is anticipated that the majority of equipment and material-related truck trips would originate at the Port of Stockton and in the city of Tracy and that the construction worker–related commute trips would occur entirely within the SFBAAB. The portion of the equipment, material, and aggregate haul trips that would originate at the Port of Stockton and in the city of Tracy would be generated in the SJVAB, which is under SJVAPCD's jurisdiction. Therefore, the heavy-duty truck trip exhaust emissions that would be generated in the SJVAB have been quantified and compared to SJVAPCD annual significance thresholds (Table 3.3-7).

Table 3.3-7. Program Construction Exhaust and Fugitive Dust Emissions within the SJVAB—Maximum Daily Unmitigated Emissions

	Estimated Maximum Annual Unmitigated Emissions (tons/year)					
Construction Activity	ROG	NO_X	CO	SO_2	PM10 Total	PM2.5 Total
Offsite truck trips	0.28	9.71	1.50	0.02	0.32	0.24
Total emissions	0.28	9.71	1.50	0.02	0.32	0.24
SJVAPCD significance threshold	10	10	NA	NA	15	15
Significant impact?	No	No	No	No	No	No

Criteria pollutant emissions of ROG, NO_X, CO, SO_2, PM10, and PM2.5 from construction equipment would incrementally add to the regional atmospheric loading of these pollutants during construction of the various projects under the program. The maximum daily unmitigated construction-related exhaust emissions that would occur in the SFBAAB have been estimated and are presented in Table 3.3-8. As discussed above under *Methods for Analysis*, construction exhaust emissions were estimated using the California Emissions Estimator Model (CalEEMod) (South Coast Air Quality Management District 2011), the EPA Emissions Factors & AP 42 Compilation of Air Pollutant Emission Factors document (U.S. Environmental Protection Agency 1995a, 1995b, 1995c), and the ARB EMission FACtors (EMFAC) 2011 model (California Air Resources Board 2013c). Maximum daily emissions were calculated for the period of time where the greatest construction activity is anticipated to occur. This time period involves the overlap of construction phases including decommissioning and foundation removal, road construction, and turbine foundations and batch plant, along with offsite truck trips and offsite worker trips. Other non-overlapping construction phases contribute to average daily and average annual emissions, but they are not counted as contributing to the maximum daily emissions that occur when the phases listed above overlap.

Table 3.3-8. Program Construction Exhaust and Fugitive Dust Emissions within the SFBAAB—Maximum Daily Unmitigated Emissions

	Estimated Maximum Daily Unmitigated Emissions (pounds/day)							
Construction Activity	ROG	NO_X	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Decommissioning and foundation removal	17.02	142.72	53.05	0.19	4.98	7.19	4.94	0.32
Laydown, substations and switch yards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Road construction	16.01	135.03	59.27	0.19	4.80	46.34	4.75	14.66
Turbine foundations and batch plant[a]	26.74	226.40	96.79	0.31	7.94	24.84	7.82	20.16
Turbine delivery and installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Utility collector line installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Restoration and cleanup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite truck trips	6.12	124.94	31.85	0.39	3.13	1.20	2.88	0.44
Offsite worker trips	0.33	1.49	10.84	0.13	0.01	0.26	0.01	0.10
Total emissions	**66.22**	**630.59**	251.79	1.20	20.87	79.84	20.40	35.69
BAAQMD significance threshold	**54**	**54**	NA	NA	82	NA	54	NA
Significant Impact?	**Yes**	**Yes**	No	No	No	No	No	No

Note: Construction activity with zero emissions means that this activity is not anticipated to occur during the time period producing the maximum daily emissions for construction.

[a] Includes construction activities along with fugitive dust emissions from the concrete batch plants.

As indicated in Table 3.3-8, maximum daily unmitigated exhaust emissions of ROG and NO_X would exceed BAAQMD's significance thresholds, resulting in a significant impact. Implementation of Mitigation Measures AQ-2a and AQ-2b would reduce construction-related exhaust emissions. As indicated in Table 3.3-7, maximum annual unmitigated exhaust emissions of ROG or NO_X that would be generated in the SJVAB would not exceed SJVAPCD's significance thresholds, resulting in a less-than-significant impact. As noted above, although the SJVAB is downwind of the project site and some emissions that are emitted at the project site within the SFBAAB would likely drift into the SJVAB due to transport, these emissions were not quantified due to the high variability in wind patterns and local weather and other conditions that contribute to emission transport and it would be speculative to quantify the amount of project-related emissions that would transport into the SJVAB. Therefore, these emissions were not estimated nor compared to the SJVAPCD's thresholds.

In addition to exhaust emissions, emissions of fugitive dust also would be generated by program-related construction activities associated with grading and earth disturbance, travel on paved and unpaved roads, and operation of the concrete batch plant and rock crusher. With regard to fugitive dust emissions, the BAAQMD Guidelines focus on implementation of dust control measures rather than comparing estimated levels of fugitive dust to quantitative significance thresholds. New and more comprehensive fugitive dust control measures have been identified by BAAQMD in its 2012 guidelines. Therefore, BAAQMD's new applicable recommended fugitive dust control measures, which are contained in Mitigation Measures AQ-2a and AQ-2b, would be implemented to reduce impacts associated with fugitive dust emissions to a less-than-significant level. Even though the BAAQMD Guidelines do not require the quantification of construction-related fugitive dust emissions, these emissions were estimated for construction activities for informational purposes and are presented in Table 3.3-8.

Individual project proponents also would be required to obtain permits from BAAQMD for the proposed construction-related operations of the concrete batch plant and the rock crusher. Fugitive sources associated with these facilities would include the transfer of sand and aggregate, truck loading, mixer loading, vehicle traffic, and wind erosion from sand and aggregate storage piles. Permit stipulations would require the use of BACTs. Permit stipulations would likely focus on increasing moisture content of the materials and may require the use of water sprays, enclosures, and baghouse devices. Implementation of BAAQMD's BACTs for batch plants and crushing equipment would ensure that fugitive dust emissions impacts that would be associated with these facilities would be less than significant. As noted above, stationary source emissions from fuel combustion at the batch plants were not estimated due to lack of data. Although these emissions would likely be minor after BACTs are implemented, these emissions would contribute to those estimated in Tables 3.3-9 through 3.3-11.

Table 3.3-9. Program Operational Exhaust and Fugitive Dust Emissions for the SFBAAB—Maximum Daily Unmitigated Emissions

	Estimated Maximum Daily Unmitigated Emissions (pounds/day)							
Operational Activity	ROG	NO_X	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Offsite worker trips	0.03	0.13	0.96	0.01	0.00	0.03	0.00	0.01
Maintenance/operation	3.38	28.05	12.52	0.04	1.15	0.73	1.14	0.04
Total emissions	3.41	28.18	13.48	0.05	1.15	0.76	1.15	0.05
BAAQMD significance threshold	54	54	NA	NA	82	NA	54	NA
Significant impact?	No	No	No	No	No	No	No	No

Table 3.3-10. Program Operational Exhaust and Fugitive Dust Emissions for the SFBAAB—Maximum Annual Unmitigated Emissions

	Estimated Maximum Annual Unmitigated Emissions (tons/day)							
Operational Activity	ROG	NO_X	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Offsite worker trips	0.00	0.02	0.13	0.00	0.00	0.00	0.00	0.00
Maintenance/operation	0.08	0.59	0.42	0.00	0.04	0.00	0.04	0.00
Total emissions	0.08	0.61	0.54	0.00	0.04	0.01	0.04	0.00
BAAQMD significance threshold	10	10	NA	NA	15	NA	10	NA
Significant impact?	No	No	No	No	No	No	No	No

Table 3.3-11. Program Construction Exhaust and Fugitive Dust Emissions within the SFBAAB—Maximum Daily Mitigated Emissions

	Estimated Maximum Daily Mitigated Emissions (pounds/day)							
Construction Activity	ROG	NO_X	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Decommissioning and foundation removal	17.02	114.18	53.05	0.19	2.74	3.24	2.72	0.15
Laydown, substations and switch yards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Road construction	16.01	108.02	59.27	0.19	2.64	20.85	2.61	6.60
Turbine foundations and batch plant[a]	26.74	181.12	96.79	0.31	4.37	11.18	4.30	9.07
Turbine delivery and installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Utility collector line installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Restoration and cleanup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite truck trips	6.12	124.94	31.85	0.39	3.13	1.20	2.88	0.44
Offsite worker trips	0.33	1.49	10.84	0.13	0.01	0.26	0.01	0.10
Total emissions	**66.22**	**529.76**	251.79	1.20	12.89	36.73	12.52	16.36
BAAQMD significance threshold	**54**	**54**	NA	NA	82	NA	54	NA
Significant impact?	**Yes**	**Yes**	No	No	No	No	No	No

Note: Construction activity with zero emissions means that this activity is not anticipated to occur during the time period producing the maximum daily emissions for construction.

[a] Includes construction activities along with fugitive dust emissions from the concrete batch plants.

Operational Activities

In addition to construction-related emissions, the program would also result in operational-related emissions associated with turbine maintenance activities, substation operation, and worker trips to and from the program area. However, daily and annual emissions of criteria pollutants associated with operational activities are anticipated to be the same under the program as under existing condition; consequently, they would not result in a significant contribution to existing air quality violations. The maximum daily unmitigated operation-related emissions that would occur in the SFBAAB have been estimated and are presented in Table 3.3-9; maximum annual unmitigated operation-related emissions are presented in Table 3.3-10.

Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures

The project proponents will require all contractors to comply with the following requirements for all areas with active construction activities.

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) will be watered as needed to maintain dust control onsite—approximately two times per day.

- All haul trucks transporting soil, sand, or other loose material offsite will be covered.
- All visible mud or dirt track-out onto adjacent public roads will be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads will be limited to 15 mph.
- All roadways, driveways, and sidewalks to be paved will be completed as soon as possible. Building pads will be laid as soon as possible after grading unless seeding or soil binders are used.
- Idling times will be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage will be provided for construction workers at all access points.
- All construction equipment will be maintained and properly tuned in accordance with manufacturer's specifications. All equipment will be checked by a certified visible emissions evaluator.
- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person will respond and take corrective action within 48 hours. The air district's phone number will also be visible to ensure compliance with applicable regulations.

Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures

The project proponents will require all contractors to comply with the following requirements for all areas with active construction activities.

- During construction activities, all exposed surfaces will be watered at a frequency adequate to meet and maintain fugitive dust control requirements of all relevant air quality management entities.
- All excavation, grading, and/or demolition activities will be suspended when average wind speeds exceed 20 mph, as measured at the Livermore Municipal Airport.
- Wind breaks (e.g., trees, fences) will be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50% air porosity.
- Vegetative ground cover (e.g., fast-germinating native grass seed) will be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
- If feasible and practicable, the simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time will be limited.
- Construction vehicles and machinery, including their tires, will be cleaned prior to leaving the construction area to remove vegetation and soil. Cleaning stations will be established at the perimeter of the construction area.

- Site accesses to a distance of 100 feet from the paved road will be treated with a 6 to 12 inch compacted layer of wood chips, mulch, or gravel.
- Sandbags or other erosion control measures will be installed to prevent silt runoff to public roadways from sites with a slope greater than 1%.
- The idling time of diesel powered construction equipment will be minimized to 2 minutes.
- The project will develop a plan demonstrating that the offroad equipment (more than 50 horsepower) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a project wide fleet-average 20% NO_X reduction and 45% PM reduction compared to the most recent ARB fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as such become available.
- Use low VOC (i.e., ROG) coatings beyond the local requirements (i.e., Regulation 8, Rule 3: Architectural Coatings).
- All construction equipment, diesel trucks, and generators will be equipped with BACT for emission reductions of NO_X and PM.
- All contractors will use equipment that meets ARB's most recent certification standard for offroad heavy duty diesel engines.

Implementation of Mitigation Measures AQ-2a and AQ-2b would ensure that impacts related to fugitive dust emissions in the SFBAAB would be less than significant. However, implementation of these measures would not reduce total ROG or NO_X emissions to a less-than-significant level (Table 3.3-11). This impact of total ROG and NO_X emissions would be significant and unavoidable.

Mitigation Measures AQ-2a and AQ-2b would not reduce the onroad emissions in the SJVAB shown in Table 3.3-7, but these emissions would not exceed SJVAPCD's significance thresholds and are, therefore, less than significant.

Impact AQ-2a-2: Violate any air quality standard or contribute substantially to an existing or projected air quality violation—program Alternative 2: 450 MW (significant and unavoidable)

Construction Activities

Construction of program Alternative 2 would occur over a period of approximately 4 years. It is estimated that there would be approximately 184 workdays per year that would involve the use of heavy construction equipment. Construction activities in the project area would include the same phases, construction equipment, and truck trips as Alternative 1. It was assumed that the daily construction activities for Alternative 2 would not differ from the daily construction activities for Alternative 1, although the period of construction would be slightly longer overall.

It is anticipated that the majority of equipment and material-related truck trips would originate at the Port of Stockton and in the city of Tracy and that the construction worker-related commute trips would occur entirely within the SFBAAB. The portion of the equipment, material, and aggregate haul trips that would originate at the Port of Stockton and in the city of Tracy would be generated in the SJVAB, which is under SJVAPCD's jurisdiction. Therefore, the heavy-duty truck trip exhaust emissions that would be generated in the SJVAB have been quantified and compared to SJVAPCD's annual significance thresholds (Table 3.3-7).

Criteria pollutant emissions of ROG, NO_X, CO, SO_2, PM10, and PM2.5 from construction equipment would incrementally add to the regional atmospheric loading of these pollutants during construction of program Alternative 2. The maximum daily unmitigated construction-related exhaust emissions that would occur in the SFBAAB are anticipated to be exactly the same as for alternative 1 and are presented in Table 3.3-8 above. This is because daily construction activity is anticipated to be the same for both alternatives. The only difference in emissions for these alternatives is total emissions over the course of the entire construction period, since Alternative 1 will be under construction for approximately 50 months and Alternative 2 will be under construction for approximately 54 months.

As discussed above, construction exhaust emissions were estimated using CalEEMod (South Coast Air Quality Management District 2011), the EPA Emissions Factors & AP 42 Compilation of Air Pollutant Emission Factors document (U.S. Environmental Protection Agency 1995a, 1995b, 1995c), and the ARB EMFAC 2011 model (California Air Resources Board 2013c). This time period involves the overlap of construction phases including decommissioning and foundation removal, road construction, and turbine foundations and batch plant, along with offsite truck trips and offsite worker trips. Other non-overlapping construction phases contribute to average daily and average annual emissions, but they are not counted as contributing to the maximum daily emissions that occur when the phases listed above overlap.

As indicated in Table 3.3-8 above, maximum daily unmitigated exhaust emissions of ROG and NO_X would exceed BAAQMD's significance threshold, resulting in a significant impact. Implementation of Mitigation Measures AQ-2a and AQ-2b would reduce construction-related exhaust emissions. As indicated in Table 3.3-7 above, maximum annual unmitigated exhaust emissions of ROG or NO_X that would be generated in the SJVAB would not exceed SJVAPCD's significance threshold, resulting in a less than significant impact. As noted above, although the SJVAB is downwind of the program area and some emissions that are emitted in the program area within the SFBAAB would likely drift into the SJVAB due to transport, these emissions were not quantified due to the high variability in wind patterns and local weather and other conditions that contribute to emission transport and it would be speculative to quantify the amount of project-related emissions that would transport into the SJVAB. Therefore, these emissions were not estimated nor compared to the SJVAPCD's thresholds. Implementation of Mitigation Measures AQ-2a and AQ-2b would, however, reduce construction-related exhaust emissions in the SJVAB.

In addition to exhaust emissions, emissions of fugitive dust also would be generated by project-related construction activities associated with grading and earth disturbance, travel on paved and unpaved roads, and operation of the concrete batch plant and rock crusher. As noted above, BAAQMD's new applicable recommended fugitive dust control measures, which are contained in Mitigation Measures AQ-2a and AQ-2b, would be implemented to reduce impacts associated with fugitive dust emissions to a less-than-significant level. Even though the BAAQMD Guidelines do not require the quantification of construction-related fugitive dust emissions, these emissions were estimated for construction activities for informational purposes and are presented in Table 3.3-8.

Project proponents also would be required to obtain permits from BAAQMD for the proposed construction-related operations of the concrete batch plant and the rock crusher. Fugitive sources associated with these facilities would include the transfer of sand and aggregate, truck loading, mixer loading, vehicle traffic, and wind erosion from sand and aggregate storage piles. Permit stipulations would require the use of BACTs. Permit stipulations would likely focus on increasing moisture content of the materials and may require the use of water sprays, enclosures, and baghouse devices. Implementation of BAAQMD's BACTs for batch plants and crushing equipment would ensure that fugitive dust emissions impacts that would be associated with these facilities would be less than significant. As noted above, stationary source emissions from fuel combustion at the batch plants were not estimated due to lack of data. Although these emissions would likely be minor after BACTs are implemented, these emissions would contribute to those estimated in Tables 3.3-9 through 3.3-11 above.

Operational Activities

In addition to construction-related emissions, the proposed project would also result in operational-related emissions associated with turbine maintenance activities, substation operation, and worker trips to and from the project area. However, daily and annual emissions of criteria pollutants associated with operational activities are anticipated to be unchanged under the proposed project and would not be considered to result in a significant contribution to existing air quality violations. The maximum daily unmitigated operation-related emissions that would occur in the SFBAAB have been estimated and are presented in Table 3.3-9 above; maximum annual unmitigated operation-related emissions are presented in Table 3.3-11 above.

Implementation of Mitigation Measures AQ-2a and AQ-2b would ensure that impacts related to fugitive dust emissions in the SFBAAB would be less than significant. However, implementation of these mitigation measures would not reduce total NO_X emissions to a less-than-significance level (Table 3.3-11). This impact of total NO_X emissions would be significant and unavoidable.

Mitigation Measures AQ-2a and AQ-2b would not reduce the onroad emissions shown in Table 3.3-7, but these emissions would not exceed SJVAPCD's significance threshold and are therefore less than significant.

Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures

Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures

Impact AQ-2b: Violate any air quality standard or contribute substantially to an existing or projected air quality violation—Golden Hills Project (significant and unavoidable)

Construction Activities

Construction of the Golden Hills Project would occur over a period of approximately 9 months. It is estimated that there would be approximately 184 workdays that would involve the use of heavy construction equipment. Construction activities in the project area would include the same phases, construction equipment, and truck trips as the program.

It is anticipated that the majority of equipment and material-related truck trips would originate at the Port of Stockton and in the city of Tracy and that the construction worker-related commute trips would occur entirely within the SFBAAB. The portion of the equipment, material, and aggregate haul trips that would originate at the Port of Stockton and in the city of Tracy would be generated in the SJVAB, which is under SJVAPCD's jurisdiction. Therefore, the heavy-duty truck trip exhaust emissions that would be generated in the SJVAB have been quantified and compared to SJVAPCD's annual significance thresholds (Table 3.3-12).

Table 3.3-12. Golden Hills Construction Exhaust and Fugitive Dust Emissions within the SJVAB—Maximum Daily Unmitigated Emissions

	Estimated Maximum Annual Unmitigated Emissions (tons/year)					
Construction Activity	ROG	NO_X	CO	SO_2	PM10 Total	PM2.5 Total
Offsite truck trips	0.25	8.58	1.32	0.01	0.28	0.22
Total emissions	0.25	8.58	1.32	0.01	0.28	0.22
SJVAPCD significance threshold	10	10	NA	NA	15	15
Significant impact?	No	No	No	No	No	No

Criteria pollutant emissions of ROG, NO_X, CO, SO_2, PM10, and PM2.5 from construction equipment would incrementally add to the regional atmospheric loading of these pollutants during construction of the Golden Hills Project. The maximum daily unmitigated construction-related exhaust emissions that would occur in the SFBAAB have been estimated and are presented in Table 3.3-13. As discussed above, construction exhaust emissions were estimated using CalEEMod (South Coast Air Quality Management District 2011), the EPA Emissions Factors & AP 42 Compilation of Air Pollutant Emission Factors document (U.S. Environmental Protection Agency 1995a, 1995b, 1995c), and the ARB EMFAC 2011 model (California Air Resources Board 2013c). This time period involves the overlap of construction phases including decommissioning and foundation removal, road construction, and turbine foundations and batch plant, along with offsite truck trips and offsite worker trips. Other non-overlapping construction phases contribute to average daily and average annual emissions, but they are not counted as contributing to the maximum daily emissions that occur when the phases listed above overlap.

Table 3.3-13. Golden Hills Construction Exhaust and Fugitive Dust Emissions within the SFBAAB—Maximum Daily Unmitigated Emissions

	Estimated Maximum Daily Unmitigated Emissions (pounds/day)							
Construction Activity	ROG	NO_X	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Decommissioning and foundation removal	15.05	126.17	46.89	0.17	4.40	6.36	4.36	0.29
Laydown, substations and switch yards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Road construction	14.16	119.36	52.40	0.16	4.25	40.96	4.20	12.96
Turbine foundations and batch plant[a]	23.63	200.14	85.56	0.28	7.02	21.96	6.92	17.83
Turbine delivery and installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Utility collector line installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Restoration and cleanup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Activity	Estimated Maximum Daily Unmitigated Emissions (pounds/day)							
Offsite truck trips	5.41	110.45	28.15	0.34	2.77	1.06	2.55	0.39
Offsite worker trips	0.29	1.32	9.58	0.11	0.01	0.23	0.01	0.09
Total emissions	**58.53**	**557.44**	222.59	1.07	18.45	70.58	18.04	31.55
BAAQMD significance threshold	**54**	**54**	NA	NA	82	NA	54	NA
Significant impact?	**Yes**	**Yes**	No	No	No	No	No	No

Note: Construction activity with zero emissions means that this activity is not anticipated to occur during the time period producing the maximum daily emissions for construction.

[a] Includes construction activities along with fugitive dust emissions from the concrete batch plants.

As indicated in Table 3.3-13, maximum daily unmitigated exhaust emissions of ROG and NO_X would exceed BAAQMD's significance threshold, resulting in a significant impact. Implementation of Mitigation Measures AQ-2a and AQ-2b would reduce construction-related exhaust emissions. As indicated in Table 3.3-12, maximum annual unmitigated exhaust emissions of ROG or NO_X that would be generated in the SJVAB would not exceed SJVAPCD's significance threshold, resulting in a less-than-significant impact. As noted above, although the SJVAB is downwind of the project site and some emissions that are emitted at the project site within the SFBAAB would likely drift into the SJVAB due to transport, these emissions were not quantified due to the high variability in wind patterns and local weather and other conditions that contribute to emission transport and it would be speculative to quantify the amount of project-related emissions that would transport into the SJVAB. Therefore, these emissions were not estimated nor compared to the SJVAPCD's thresholds. Implementation of Mitigation Measures AQ-2a and AQ-2b would, however, reduce construction-related exhaust emissions in the SJVAB.

In addition to exhaust emissions, emissions of fugitive dust also would be generated by project-related construction activities associated with grading and earth disturbance, travel on paved and unpaved roads, and operation of the concrete batch plant and rock crusher. As noted above, BAAQMD's new applicable recommended fugitive dust control measures, which are contained in Mitigation Measures AQ-2a and AQ-2b, would be implemented to reduce impacts associated with fugitive dust emissions to a less-than-significant level. Even though the BAAQMD Guidelines do not require the quantification of construction-related fugitive dust emissions, these emissions were estimated for construction activities for informational purposes and are presented in Table 3.3-13.

Project proponents also would be required to obtain permits from BAAQMD for the proposed construction-related operations of the concrete batch plant and the rock crusher. Fugitive sources associated with these facilities would include the transfer of sand and aggregate, truck loading, mixer loading, vehicle traffic, and wind erosion from sand and aggregate storage piles. Permit stipulations would require the use of BACTs. Permit stipulations would likely focus on increasing moisture content of the materials and may require the use of water sprays, enclosures, and baghouse devices. Implementation of BAAQMD's BACTs for batch plants and crushing equipment would ensure that fugitive dust emissions impacts that would be associated with these facilities would be less than significant. As noted above, stationary source emissions from fuel combustion at the batch plants were not estimated due to lack of data. Although these emissions would likely be minor after BACTs are implemented, these emissions would contribute to those estimated in Tables 3.3-14 through 3.3-16.

Table 3.3-14. Golden Hills Operational Exhaust and Fugitive Dust Emissions for the SFBAAB—Maximum Daily Unmitigated Emissions

	Estimated Maximum Daily Unmitigated Emissions (pounds/day)							
Operational Activity	ROG	NO_X	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Offsite worker trips	0.02	0.12	0.85	0.01	0.00	0.02	0.00	0.01
Maintenance/operation	2.99	24.79	11.07	0.03	1.02	0.65	1.01	0.03
Total emissions	3.02	24.91	11.92	0.04	1.02	0.67	1.01	0.04
BAAQMD significance threshold	54	54	NA	NA	82	NA	54	NA
Significant impact?	No	No	No	No	No	No	No	No

Table 3.3-15. Golden Hills Operational Exhaust and Fugitive Dust Emissions for the SFBAAB—Maximum Annual Unmitigated Emissions

	Estimated Maximum Annual Unmitigated Emissions (tons/day)							
Operational Activity	ROG	NO_X	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Offsite worker trips	0.00	0.02	0.11	0.00	0.00	0.00	0.00	0.00
Maintenance/operation	0.07	0.52	0.37	0.00	0.04	0.00	0.04	0.00
Total emissions	0.07	0.54	0.48	0.00	0.04	0.01	0.04	0.00
BAAQMD significance threshold	10	10	NA	NA	15	NA	10	NA
Significant impact?	No	No	No	No	No	No	No	No

Table 3.3-16. Golden Hills Program Construction Exhaust and Fugitive Dust Emissions within the SFBAAB—Maximum Daily Mitigated Emissions

	Estimated Maximum Daily Mitigated Emissions (pounds/day)							
Construction Activity	ROG	NO_X	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Decommissioning and foundation removal	15.05	100.93	46.89	0.17	2.42	2.86	2.40	0.13
Laydown, substations and switch yards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Road construction	14.16	95.49	52.40	0.16	2.34	18.43	2.31	5.83
Turbine foundations and batch plant[a]	23.63	160.11	85.56	0.28	3.86	9.88	3.80	8.02
Turbine delivery and installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Utility collector line installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Restoration and cleanup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite truck trips	5.41	110.45	28.15	0.34	2.77	1.06	2.55	0.39
Offsite worker trips	0.29	1.32	9.58	0.11	0.01	0.23	0.01	0.09

Construction Activity	Estimated Maximum Daily Mitigated Emissions (pounds/day)							
	ROG	NO_X	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Total emissions	**58.53**	**468.31**	222.59	1.07	11.40	32.47	11.07	14.46
BAAQMD significance threshold	**54**	**54**	NA	NA	82	NA	54	NA
Significant impact?	**Yes**	**Yes**	No	No	No	No	No	No

Note: Construction activity with zero emissions means that this activity is not anticipated to occur during the time period producing the maximum daily emissions for construction.

[a] Includes construction activities along with fugitive dust emissions from the concrete batch plants

Operational Activities

In addition to construction-related emissions, the proposed project would also result in operational-related emissions associated with turbine maintenance activities, substation operation, and worker trips to and from the project area. However, daily and annual emissions of criteria pollutants associated with operational activities are anticipated to be unchanged under the proposed project and would not be considered to result in a significant contribution to existing air quality violations. The maximum daily unmitigated operation-related emissions that would occur in the SFBAAB have been estimated and are presented in Table 3.3-14; maximum annual unmitigated operation-related emissions are presented in Table 3.3-15.

Implementation of Mitigation Measures AQ-2a and AQ-2b would ensure that impacts related to fugitive dust emissions in the SFBAAB would be less than significant. However, implementation of these mitigation measures would not reduce total NO_X emissions to a less-than-significance level (Table 3.3-16). This impact of total NO_X emissions would be significant and unavoidable.

Mitigation Measures AQ-2a and AQ-2b would not reduce the onroad emissions shown in Table 3.3-12, but these emissions would not exceed SJVAPCD's significance threshold and are therefore less than significant.

Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures

Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures

Impact AQ-2c: Violate any air quality standard or contribute substantially to an existing or projected air quality violation—Patterson Pass Project (significant and unavoidable)

Construction Activities

Construction of the Patterson Pass Project would occur over a period of approximately 9 months. It is estimated that there would be approximately 184 workdays that would involve the use of heavy construction equipment. Construction activities in the project area would include the same phases, construction equipment, and truck trips as the program.

It is anticipated that the majority of equipment and material-related truck trips would originate at the Port of Stockton and in the city of Tracy and that the construction worker-related commute trips would occur entirely within the SFBAAB. The portion of the equipment, material, and aggregate haul trips that would originate at the Port of Stockton and in the city of Tracy would be generated in the SJVAB, which is under SJVAPCD's jurisdiction. Therefore, the heavy-duty truck trip exhaust emissions that would be generated in the SJVAB have been quantified and compared to SJVAPCD's annual significance thresholds (Table 3.3-17).

Table 3.3-17. Patterson Pass Construction Exhaust and Fugitive Dust Emissions within the SJVAB—Maximum Daily Unmitigated Emissions

	Estimated Maximum Annual Unmitigated Emissions (tons/year)					
Construction Activity	ROG	NO_X	CO	SO_2	PM10 Total	PM2.5 Total
Offsite truck trips	0.06	1.92	0.30	0.00	0.06	0.05
Total emissions	0.06	1.92	0.30	0.00	0.06	0.05
SJVAPCD significance threshold	10	10	NA	NA	15	15
Significant impact?	No	No	No	No	No	No

Criteria pollutant emissions of ROG, NO_X, CO, SO_2, PM10, and PM2.5 from construction equipment would incrementally add to the regional atmospheric loading of these pollutants during construction of the Patterson Pass Project. The maximum daily unmitigated construction-related exhaust emissions that would occur in the SFBAAB have been estimated and are presented in Table 3.3-18. As discussed above, construction exhaust emissions were estimated using CalEEMod (South Coast Air Quality Management District 2011), the EPA Emissions Factors & AP 42 Compilation of Air Pollutant Emission Factors document (U.S. Environmental Protection Agency 1995a, 1995b, 1995c), and the ARB EMFAC 2011 model (California Air Resources Board 2013c). This time period involves the overlap of construction phases including decommissioning and foundation removal, road construction, and turbine foundations and batch plant, along with offsite truck trips and offsite worker trips. Other non-overlapping construction phases contribute to average daily and average annual emissions, but they are not counted as contributing to the maximum daily emissions that occur when the phases listed above overlap.

As indicated in Table 3.3-18, maximum daily unmitigated exhaust emissions of NO_X would exceed BAAQMD's significance threshold, resulting in a significant impact. Implementation of Mitigation Measures AQ-2a and AQ-2b would reduce construction-related exhaust emissions. As indicated in Table 3.3-17, maximum annual unmitigated exhaust emissions of ROG or NO_X that would be generated in the SJVAB would not exceed SJVAPCD's significance thresholds, resulting in a less-than-significant impact. Implementation of Mitigation Measures AQ-2a and AQ-2b would, however, reduce construction-related exhaust emissions in the SJVAB. As noted above, although the SJVAB is downwind of the project site and some emissions that are emitted at the project site within the SFBAAB may drift into the SJVAB due to transport, these emissions were not quantified due to the high variability in wind patterns and local weather and other conditions that contribute to emission transport and it would be speculative to quantify the amount of project-related emissions that would transport into the SJVAB. Therefore, these emissions were not estimated nor compared to the SJVAPCD's thresholds.

Table 3.3-18. Patterson Pass Construction Exhaust and Fugitive Dust Emissions within the SFBAAB—Maximum Daily Unmitigated Emissions

	Estimated Maximum Daily Unmitigated Emissions (pounds/day)							
Construction Activity	ROG	NO_X	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Decommissioning and foundation removal	3.37	28.26	10.50	0.04	0.99	1.42	0.98	0.06
Laydown, substations and switch yards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Road construction	3.17	26.74	11.74	0.04	0.95	9.18	0.94	2.90
Turbine foundations and batch plant[a]	5.29	44.83	19.16	0.06	1.57	4.92	1.55	3.99
Turbine delivery and installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Utility collector line installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Restoration and cleanup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite truck trips	1.21	24.74	6.31	0.08	0.62	0.24	0.57	0.09
Offsite worker trips	0.06	0.30	2.15	0.02	0.00	0.05	0.00	0.02
Total emissions	13.11	**124.86**	49.86	0.24	4.13	15.81	4.04	7.07
BAAQMD significance threshold	54	**54**	NA	NA	82	NA	54	NA
Significant impact?	No	**Yes**	No	No	No	No	No	No

Note: Construction activity with zero emissions means that this activity is not anticipated to occur during the time period producing the maximum daily emissions for construction.

[a] Includes construction activities along with fugitive dust emissions from the concrete batch plants.

In addition to exhaust emissions, emissions of fugitive dust also would be generated by project-related construction activities associated with grading and earth disturbance, travel on paved and unpaved roads, and operation of the concrete batch plant and rock crusher. As noted above, BAAQMD's new applicable recommended fugitive dust control measures, which are contained in Mitigation Measures AQ-2a and AQ-2b, would be implemented to reduce impacts associated with fugitive dust emissions to a less-than-significant level. Even though the BAAQMD Guidelines do not require the quantification of construction-related fugitive dust emissions, these emissions were estimated for construction activities for informational purposes and are presented in Table 3.3-18.

The project proponent also would be required to obtain permits from BAAQMD for the proposed construction-related operations of the concrete batch plant and the rock crusher. Fugitive sources associated with these facilities would include the transfer of sand and aggregate, truck loading, mixer loading, vehicle traffic, and wind erosion from sand and aggregate storage piles. Permit stipulations would require the use of BACTs. Permit stipulations would likely focus on increasing moisture content of the materials and may require the use of water sprays, enclosures, and baghouse devices. Implementation of BAAQMD's BACTs for batch plants and crushing equipment would ensure that fugitive dust emissions impacts that would be associated with these facilities would be less than significant. As noted above, stationary source emissions from fuel combustion at the batch plants were not estimated due to lack of data. Although these emissions would likely be minor after BACTs are implemented, these emissions would contribute to those estimated in Tables 3.3-19 through 3.3-21.

Table 3.3-19. Patterson Pass Operational Exhaust and Fugitive Dust Emissions within the SFBAAB—Maximum Daily Unmitigated Emissions

	Estimated Maximum Daily Unmitigated Emissions (pounds/day)							
Operational Activity	ROG	NO_X	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Offsite worker trips	0.01	0.03	0.19	0.00	0.00	0.01	0.00	0.00
Maintenance/operation	0.67	5.55	2.48	0.01	0.23	0.14	0.23	0.01
Total emissions	0.68	5.58	2.67	0.01	0.23	0.15	0.23	0.01
BAAQMD significance threshold	54	54	NA	NA	82	NA	54	NA
Significant impact?	No	No	No	No	No	No	No	No

Table 3.3-20. Patterson Pass Operational Exhaust and Fugitive Dust Emissions within the SFBAAB—Maximum Annual Unmitigated Emissions

	Estimated Maximum Annual Unmitigated Emissions (tons/day)							
Operational Activity	ROG	NO_X	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Offsite worker trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Maintenance/operation	0.02	0.12	0.08	0.00	0.01	0.00	0.01	0.00
Total emissions	0.02	0.12	0.11	0.00	0.01	0.00	0.01	0.00
BAAQMD significance threshold	10	10	NA	NA	15	NA	10	NA
Significant impact?	No	No	No	No	No	No	No	No

Table 3.3-21. Patterson Pass Construction Exhaust and Fugitive Dust Emissions within the SFBAAB—Maximum Daily Mitigated Emissions

	Estimated Maximum Daily Mitigated Emissions (pounds/day)							
Construction Activity	ROG	NO_X	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Decommissioning and foundation removal	3.37	22.61	10.50	0.04	0.54	0.64	0.54	0.03
Laydown, substations and switch yards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Road construction	3.17	21.39	11.74	0.04	0.52	4.13	0.52	1.31
Turbine foundations and batch plant[a]	5.29	35.86	19.16	0.06	0.86	2.21	0.85	1.80
Turbine delivery and installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Utility collector line installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Restoration and cleanup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite truck trips	1.21	24.74	6.31	0.08	0.62	0.24	0.57	0.09
Offsite worker trips	0.06	0.30	2.15	0.02	0.00	0.05	0.00	0.02
Total emissions	13.11	**104.89**	49.86	0.24	2.55	7.27	2.48	3.24

Construction Activity	Estimated Maximum Daily Mitigated Emissions (pounds/day)						
BAAQMD significance threshold	54	**54**	NA	NA	82	NA	54	NA
Significant impact?	No	**Yes**	No	No	No	No	No	No

Note: Construction activity with zero emissions means that this activity is not anticipated to occur during the time period producing the maximum daily emissions for construction.

[a] Includes construction activities along with fugitive dust emissions from the concrete batch plants

Operational Activities

In addition to construction-related emissions, the proposed project would also result in operational-related emissions associated with turbine maintenance activities, substation operation, and worker trips to and from the project area. However, daily and annual emissions of criteria pollutants associated with operational activities are anticipated to be unchanged under the proposed project and would not be considered to result in a significant contribution to existing air quality violations. The maximum daily unmitigated operation-related emissions that would occur in the SFBAAB have been estimated and are presented in Table 3.3-19; maximum annual unmitigated operation-related emissions are presented in Table 3.3-20.

Implementation of Mitigation Measures AQ-2a and AQ-2b would ensure that impacts related to fugitive dust emissions in the SFBAAB would be less than significant. However, implementation of these measures would not reduce total NO_X emissions to a less-than-significance level (Table 3.3-21). The impact of total NO_X emissions would be significant and unavoidable.

Mitigation Measures AQ-2a and AQ-2b would not reduce the onroad emissions shown in Table 3.3-17, but these emissions would not exceed SJVAPCD's significance threshold and are, therefore, less than significant.

Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures

Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures

Impact AQ-3a-1: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)—program Alternative 1: 417 MW (significant and unavoidable for construction and less than significant for operation)

Operation of program Alternative 1 would not result in new permanent stationary sources of criteria pollutants, nor would it increase criteria pollutant emissions from any existing stationary sources. Depending on the construction activities underway during any given month, from 40 to 150 workers would be at the site during construction. No new permanent workers would be employed under the program. Drive-by inspections and scheduled wind turbine maintenance would continue to occur on a daily, weekly, or monthly basis and would be conducted by existing technicians and operations personnel. These activities would continue to be performed per the requirements of the equipment specifications and standard industry practice. Daily emissions of criteria pollutants associated with these activities are anticipated to be unchanged under the program and would not be considered to result in a significant contribution to existing air quality violations.

However, as noted above, projects that would result in an increase in ROG, NO_X, PM10, or PM2.5 of more than their respective project-level daily mass thresholds indicated in Table 3.3-5 would also be considered to contribute considerably to a significant cumulative impact. Because construction emissions of ROG and NO_X for Alternative 1 are greater than the BAAQMD thresholds after the implementation of Mitigation Measures AQ-2a and AQ-2b, (Table 3.3-11), construction impacts are significant and unavoidable.

Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures

Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures

Impact AQ-3a-2: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)—program Alternative 2: 450 MW (significant and unavoidable for construction and less than significant for operation)

Operation of program Alternative 2 would not result in new permanent stationary sources of criteria pollutants, nor would it increase criteria pollutant emissions from any existing stationary sources. No new permanent workers would be employed under the proposed project. Drive-by inspections and scheduled wind turbine maintenance would continue to occur on a daily, weekly, or monthly basis and would be conducted by existing technicians and operations personnel. These activities would continue to be performed per the requirements of the equipment specifications and standard industry practice. Daily emissions of criteria pollutants associated with these activities are anticipated to be unchanged under the proposed project and would not be considered to result in a significant contribution to existing air quality violations.

Because construction emissions of ROG and NO_X for Alternative 2 would be greater than the BAAQMD thresholds after the implementation of Mitigation Measures AQ-2a and AQ-2b, (Table 3.3-11), construction impacts would be significant and unavoidable.

Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures

Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures

Impact AQ-3b: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)—Golden Hills Project (significant and unavoidable for construction and less than significant for operation)

Operation of the Golden Hills Project would not result in new permanent stationary sources of criteria pollutants, nor would it increase criteria pollutant emissions from any existing stationary sources. No new permanent workers would be employed under the proposed project. Drive-by inspections and scheduled wind turbine maintenance would continue to occur on a daily, weekly, or monthly basis and would be conducted by existing technicians and operations personnel. These activities would continue to be performed per the requirements of the equipment specifications and standard industry practice. Daily emissions of criteria pollutants associated with these activities are anticipated to be unchanged under the proposed project and would not be considered to result in a significant contribution to existing air quality violations.

Because construction emissions of NO_X for the Golden Hills Project would be greater than the BAAQMD thresholds after the implementation of Mitigation Measures AQ-2a and AQ-2b, (Table 3.3-16), construction impacts would be significant and unavoidable.

Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures

Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures

Impact AQ-3c: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)—Patterson Pass Project (significant and unavoidable for construction and less than significant for operation)

Operation of the Patterson Pass Project would not result in new permanent stationary sources of criteria pollutants, nor would it increase criteria pollutant emissions from any existing stationary sources. No new permanent workers would be employed under the proposed project. Drive-by inspections and scheduled wind turbine maintenance would continue to occur on a daily, weekly, or monthly basis and would be conducted by existing technicians and operations personnel. These activities would continue to be performed per the requirements of the equipment specifications and standard industry practice. Daily emissions of criteria pollutants associated with these activities are anticipated to be unchanged under the proposed project and would not be considered to result in a significant contribution to existing air quality violations.

Because construction emissions of NO_X for the Patterson Pass Project would be greater than the BAAQMD thresholds after the implementation of Mitigation Measures AQ-2a and AQ-2b, (Table 3.3-21), construction impacts would be significant and unavoidable.

Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures

Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures

Impact AQ-4a-1: Expose sensitive receptors to substantial pollutant concentrations—program Alternative 1: 417 MW (less than significant with mitigation)

Long-term operations associated with the program would result in no new emissions. Construction activities would generate air pollutant emissions, including equipment exhaust emissions and suspended and inhalable PM. However, construction activities would occur over a relatively short period of approximately 4 years, and associated emissions would be spatially dispersed over the approximately 49,202-acre program area. In addition, the closest sensitive receptors to the program area are a community of single-family residences in the city of Livermore located approximately 4,500 feet to the west of the program area boundary and the Mountain House community of single-family residences, three elementary schools childcare facilities, and parks and open space areas, located approximately 5,000 feet to the east of the program area boundary. The emissions modeling shows that a majority of DPM exhaust emissions (PM10 and PM2.5) are associated with turbine foundations and batch plant and offsite truck trips. The cement batch plants, which represent a stationary source of emissions, would not likely be located at the program area boundary. As such, the distance from the batch plants to the nearest sensitive receptors would likely be greater than 4,500 feet. Regarding offsite truck trips, these would be transitory and would occur on multiple roads over a widespread area, thereby helping to disperse toxic pollutants and minimize exposure. Therefore, program-related construction emissions would be sufficiently diluted at the nearest sensitive receptor locations.

With implementation of Mitigation Measures AQ-2a and AQ-2b, which would reduce both criteria pollutants and toxic air contaminant emissions from construction equipment and reduce the potential health risks to sensitive receptors, this impact would be less than significant.

Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures

Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures

Impact AQ-4a-2: Expose sensitive receptors to substantial pollutant concentrations—program Alternative 2: 450 MW (less than significant with mitigation)

The impact of program Alternative 2 is the same as for program Alternative 1. Construction activities would occur over a relatively short period of approximately 4 years, and associated emissions would be spatially dispersed over the approximately 49,202-acre project area. With implementation of Mitigation Measures AQ-2a and AQ-2b, which would reduce both criteria pollutants and toxic air contaminant emissions from construction equipment and reduce the potential health risks to sensitive receptors, this impact would be less than significant.

Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures

Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures

Impact AQ-4b: Expose sensitive receptors to substantial pollutant concentrations—Golden Hills Project (less than significant with mitigation)

The impact for the Golden Hills Project is the same as for the program. Construction activities are anticipated to last for only 10 months, and associated emissions would be spatially dispersed over the approximately 4,584-acre project area. With implementation of Mitigation Measures AQ-2a and AQ-2b, which would reduce both criteria pollutants and toxic air contaminant emissions from construction equipment and reduce the potential health risks to sensitive receptors, this impact would be less than significant.

Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures

Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures

Impact AQ-4c: Expose sensitive receptors to substantial pollutant concentrations—Patterson Pass Project (less than significant with mitigation)

The impact for the Patterson Pass Project is the same as for the program. Construction activities are anticipated to last for only 10 months, and associated emissions would be spatially dispersed over the approximately 945-acre project area. With implementation of Mitigation Measures AQ-2a and AQ-2b, which would reduce both criteria pollutants and toxic air contaminant emissions from construction equipment and reduce the potential health risks to sensitive receptors, this impact would be less than significant.

Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures

Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures

Impact AQ-5a-1: Create objectionable odors affecting a substantial number of people—program Alternative 1: 417 MW (less than significant)

Typical odor sources of concern include wastewater treatment plants, sanitary landfills, transfer stations, composting facilities, petroleum refineries, asphalt batch plants, chemical manufacturing facilities, animal feedlots, fiberglass manufacturing facilities, auto body shops, and rendering plants. The program would result in the development of new wind turbine generators that would not result in objectionable odors. Although program construction would involve the use of diesel equipment and a temporary batch plant that could result in the creation of odors, the construction activities would be temporary (approximately 5 years),spatially dispersed over the 49,202-acre program area, and would take place in areas that are not in the vicinity of sensitive receptors. Therefore, the program would not affect a substantial number of people.

This impact would be less than significant. No mitigation is required.

Impact AQ-5a-2: Create objectionable odors affecting a substantial number of people—program Alternative 2: 450 MW (less than significant)

The impact for program Alternative 2 is the same as for program Alternative 1. Although project construction would involve the use of diesel equipment and a temporary batch plant that could result in the creation of odors, the construction activities would be temporary (approximately 4 years), spatially dispersed over the 49,202-acre project area, and would take place in areas that are not in the vicinity of sensitive receptors. Therefore, the proposed project would not affect a substantial number of people.

This impact would be less than significant. No mitigation is required.

Impact AQ-5b: Create objectionable odors affecting a substantial number of people—Golden Hills Project (less than significant)

The impact for the Golden Hills Project is the same as for the program. Although project construction would involve the use of diesel equipment and a temporary batch plant that could result in the creation of odors, the construction activities would be temporary (approximately 10 months), spatially dispersed over the 4,584-acre project area, and would take place in areas that are not in the vicinity of sensitive receptors. Therefore, the proposed project would not affect a substantial number of people.

This impact would be less than significant. No mitigation is required.

Impact AQ-5c: Create objectionable odors affecting a substantial number of people—Patterson Pass Project (less than significant)

The impact for the Patterson Pass Project is the same as for the program. Although project construction would involve the use of diesel equipment and a temporary batch plant that could result in the creation of odors, the construction activities would be temporary (approximately 10 months), spatially dispersed over the 945-acre project area, and would take place in areas that are not in the vicinity of sensitive receptors. Therefore, the proposed project would not affect a substantial number of people.

This impact would be less than significant. No mitigation is required.

Cumulative Analysis

Cumulative impacts related to air quality are addressed in Impacts AQ-3a-1, AQ-3a-2, AQ-3b, and AQ-3c. Impacts would be significant and unavoidable for construction and less than significant for operation.

3.3.3 References Cited

Printed References

Alameda County. 1998. *Draft Environmental Impact Report—Repowering a Portion of the Altamont Pass Wind Resource Area*. August. State Clearinghouse #98022024. Hayward, CA: Alameda County Community Development Agency.

———. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

Bay Area Air Quality Management District. 2010. *Bay Area Air Quality Management District—Livermore Valley*. Available: http://www.baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Bay-Area-Climatology/Subregions/Livermore-Valley.aspx. Last Updated: October 4, 2010. Accessed: June 26, 2013.

———. 2011. *California Environmental Quality Act Air Quality Guidelines*. Available: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines%20May%202011.ashx. Last Updated: May 2011. Accessed: July 10, 2013.

———. 2012. *California Environmental Quality Act Air Quality Guidelines*. Available: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_Final_May%202012.ashx?la=en. Last Updated: May 2012. Accessed: July 10, 2013.

California Air Resources Board. 1998*. Findings of the Scientific Review on the Report on Diesel Exhaust*. Adopted April 22. Available: http://www.arb.ca.gov/toxics/dieseltac/combined.pdf. Accessed: April 8, 2013.

———. 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. Sacramento, CA. Prepared by Stationary Source Division and Mobile Source Control Division. Available: http://www.arb.ca.gov/diesel/documents/rrpfinal.pdf. Accessed: June 27, 2013.

———. 2009. *The California Almanac of Emissions and Air Quality – 2009 Edition. Chapter 4: Air Basin Trends and Forecasts -- Criteria Pollutants*. Available: http://www.arb.ca.gov/aqd/almanac/almanac09/pdf/chap409.pdf. Accessed: February 12, 2014.

———. 2011. *Area Designations Maps*. Available: http://www.arb.ca.gov/desig/adm/adm.htm. Accessed: June 26, 2013.

———. 2013a. *Ambient Air Quality Standards*. June. Available: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf. Accessed: June 26, 2013.

———. 2013b. *Top 4 Summary: Pollutant/Year Range Selection*. Available: http://www.arb.ca.gov/adam/topfour/topfour1.php. Accessed: June 26, 2013.

———. 2013c. *Emission Factor Model (EMFAC) 2011*. Available: http://www.arb.ca.gov/msei/modeling.htm. Accessed: June 9, 2013.

Contra Costa County. 2010. *Vasco Winds Repowering Project Draft Environmental Impact Report and Appendices*. December. Available: http://www.co.contra-costa.ca.us/DocumentCenter/Home/View/5349. Accessed: July 10, 2010.

San Joaquin Valley Air Pollution Control District. 2002. *Guide for Assessing and Mitigating Air Quality Impacts*. Last Revised: January 10, 2002. Available: http://www.valleyair.org/transportation/CEQA%20Rules/GAMAQI%20Jan%202002%20Rev.pdf. Accessed: July 18, 2013.

———. 2013. *Ambient Air Quality Standards and Valley Attainment Status*. Available: http://www.valleyair.org/aqinfo/attainment.htm. Accessed: July 18, 2013.

South Coast Air Quality Management District. 2006. *Particulate Matter (PM) 2.5 Significance Thresholds and Calculation Methodology*. Appendix A—Updated CEIDARS Table with PM2.5 Fractions. Available: http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html. Accessed: July 10, 2013.

———. 2011. *California Emission Estimator Model (CalEEMod). User's Guide Version 2011.1*—Appendix D Default Data Tables—Table 3.4. Developed by ENVIRON International Corporation in collaboration with SCAQMD and other California Air Districts. Available: http://www.caleemod.com/. Accessed: October 4, 2011.

U.S. Environmental Protection Agency. 1995a. *AP 42, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources*. Fifth Edition. Chapter 3.3, Gasoline and Diesel Industrial Engines. Available: http://www.epa.gov/ttn/chief/ap42/ch03/final/c03s03.pdf. Accessed: July 9, 2013.

———. 1995b. *AP 42, Compilation of Air Pollutant Emission Factors.* Fifth Edition. Section 11.9, Western Surface Coal Mining. As Cited in CalEEMod User Guide (2011), Appendix A (page 8). Available: http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s09.pdf. Accessed: July 9, 2013.

———. 1995c. *AP 42, Compilation of Air Pollutant Emission Factors*. Fifth Edition. Section 11.12, Concrete Batching. Available: http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s12.pdf. Accessed: July 10, 2013.

———. 2012. *The Green Book Nonattainment Areas for Criteria Pollutants.* Last Revised: December 14, 2012. Available: http://www.epa.gov/oar/oaqps/greenbk/. Accessed: June 27, 2013.

———. 2013a. *Nitrogen Dioxide.* Last Updated: April 4, 2013. Available: http://www.epa.gov/airquality/nitrogenoxides/. Accessed: June 26, 2013.

———. 2013b. *Health|Nitrogen Dioxide*. Last Updated: February 14, 2013. Available: http://www.epa.gov/airquality/nitrogenoxides/health.html. Accessed: June 26, 2013.

Western Regional Climate Center. 2013. *Period of Record Monthly Climate Summaries for Livermore, California*. Available: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca4997. Accessed: June 26, 2013.

Personal Communications

Kirk, Alison. Senior Environmental Planner, Bay Area Air Quality Management District, Planning and Research Division. August 31, 2011—email describing the intent of the BAAQMD daily construction emissions thresholds.

Siong, Patia. Air Quality Planner, San Joaquin Valley Unified Air Pollution Control District. May 23, 2011—email to Shannon Hatcher regarding construction thresholds.

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 program and the two individual projects are analyzed. Potential impacts are described quantitatively and qualitatively in Section 3.4.2, *Environmental Impacts*. This section also identifies specific and detailed measures to avoid, minimize, or compensate for potentially significant impacts on biological resources, where necessary.

3.4.1 Existing Conditions

Regulatory Setting

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 the ESA, in part, as killing, harming, or harassing. 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) of the ESA, or a federal interagency consultation, under Section 7 of the ESA, 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 Golden Hills and Patterson Pass projects as well as subsequent repowering projects. Accordingly, such projects would require consultation with USFWS as described above.

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 the California Department of Fish and Wildlife (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 November 1, 2013 *Federal Register* (78 FR 65844–65864). 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. Take of nongame migratory birds cannot be authorized through the MBTA for the program or Patterson Pass and Golden Hills projects. 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 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, the 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 (*Haliaeetus leucocephalus*) 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, and can be applied for by individuals, companies, government agencies (including tribal governments), and other organizations to allow disturbance of 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 new 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 (ECP Guidance) intended to assist parties to avoid, minimize, and mitigate adverse effects on bald and golden eagles (U.S. Fish and Wildlife Service 2013a). 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 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, one programmatic eagle take permit has been issued by USFWS on June 31, 2014 (http://www.fws.gov/cno/conservation/migratorybirds.html).

Clean Water Act

Wetlands and other waters of the United States are protected under Section 404 of the Clean Water Act (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 (i.e., conditions of flooding, inundation, or saturation that support wetland communities).

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.

Federal Noxious Weed Act and Code of Federal Regulations (Title 7, Part 360)

These laws and regulations are primarily concerned with the introduction of federally designated noxious weed plants or seeds across the United States' international borders. The Federal Noxious Weed Act (7 USC 2801–2813) also regulates the interstate movement of designated noxious weeds under the U.S. Department of Agriculture's permit system.

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 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.

State Plans, Policies, and Regulations

California Environmental Quality Act

CEQA is the regulatory framework by which California public agencies identify and mitigate significant environmental impacts. 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 guidelines state that the lead agency preparing an EIR must consult with and receive written findings from 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.

California Endangered Species Act

CESA (California Fish and Game Code Sections 2050–2116) states that all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants and their habitats that are threatened with extinction and those experiencing a significant decline that, if not halted, would lead to a threatened or endangered designation will be protected or preserved.

Under Section 2081 of the California Fish and Game Code, an incidental take permit from CDFW is required for projects that could result in the take of a species that is state-listed as threatened or endangered. Under CESA, *take* is defined as an activity that would directly or indirectly kill an individual of a species. The definition does not include *harm* or *harass*, as does the definition of take under ESA. Consequently, the threshold for take under CESA is higher than that under ESA. For example, habitat modification is not necessarily considered take under CESA.

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 a Natural Community Conservation Plan (NCCP) has been adopted.

California Native Plant Protection Act

The CNPPA of 1977 gave the California Fish and Game Commission the authority to list plant species as rare or endangered and authorized them to adopt regulations prohibiting importation of rare and endangered plants into California, take of rare and endangered plants, and sale of rare and endangered plants. The CNPPA prohibits take, possession, transportation, exportation, importation, or sale of rare and threatened plants, except as a result of agricultural practices, fire control measures, timber operations, mining, or actions of public agencies or private utilities. Private landowners are also exempt from the prohibition against removing rare and endangered plants, although they must provide 10-day notice to CDFW before removing the plants. The CNPPPA has mostly been superseded by CESA.

California Rare Plant Rankings

CDFW maintains lists of plants of special concern in California, in addition to those listed as threatened or endangered. These species have no formal protection under CESA, but the values and importance of these lists are widely recognized. Plants with a California Rare Plant Rank of 1A, 1B, and 2 meet the definitions of Section 1901 of the California Fish and Game Code and may qualify for state listing. Accordingly, for purposes of this analysis, such plant species are considered rare plants pursuant to Section 15380 of CEQA.

Protection of Birds and Raptors

Section 3503 of the California 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. 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. CDFW cannot issue permits under MBTA for the take of birds by the program or the Golden Hills and Patterson Pass projects.

Section 1600 of the California Fish and Game Code

Sections 1600–1603 of the California Fish and Game Code state that it is unlawful for any person or agency to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources, or to use any material from the streambeds, without first notifying CDFW. A Lake and Streambed Alteration Agreement (LSAA) must be obtained if effects are expected to occur. The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks and that supports wildlife, fish, or other aquatic life. This definition includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation. CDFW’s jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Act, waters of the state fall under jurisdiction of the nine Regional Water Quality Control Boards (RWQCBs). Under this act, each RWQCB must prepare and periodically update water quality control 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 RWQCB. Pursuant to CWA Sections 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 RWQCB 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 obtain a water quality certification from the applicable RWQCB.

Section 13050 of the Porter-Cologne Act (California Water Code, Division 7) authorizes the State Water Resources Control Board and the relevant Regional Water Quality Control Board (in the case of the APWRA, the Central Valley and San Francisco Bay Water Boards) 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.

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.

Regional and Local Plans, Policies, and Regulations

East County Area Plan

Land use planning in the eastern portion of Alameda County is governed by the ECAP, which was adopted by the County in May 1994. 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 (Alameda County 2000). The Open Space Element of the ECAP addresses sensitive lands and regionally significant open space, including biological resources. Windfarms are addressed in the Special Land Uses section of the ECAP.

East Alameda County Conservation Strategy

The East Alameda County Conservation Strategy (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 focus on 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 will ultimately enable local projects to comply with state and federal regulatory requirements within a framework of comprehensive conservation goals and objectives, and will facilitate 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% of Alameda County in the upper Alameda Creek watershed of the central county area, and the east-facing slopes of the Altamont Hills. The cities of Dublin, Livermore, and Pleasanton are within the EACCS study area. The western boundary of the EACCS study area follows the western edge of 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 program area.

A final draft of the EACCS was completed in October 2010 and released to the public in March 2011. On May 31, 2012, USFWS issued the *Programmatic Biological Opinion for the East Alameda County*

Conservation Strategy (reference No. 08ESMFOO-2012-F-0092-1) (Programmatic BO). Installation, operation, and maintenance of wind energy projects are identified as covered infrastructure projects under the Programmatic BO. However, avian and bat effects associated with these types of projects are not covered under the Programmatic BO. Individual projects may be appended to the Programmatic BO if they are consistent with the EACCS, occur within the EACCS study area, and are a covered activity. The Programmatic BO does not provide incidental take authorization; therefore, individual projects appended to the Programmatic BO will be granted individual take coverage as part of the project's Section 7 consultation process. Because the EACCS is designed to be an adaptive management process, the Programmatic BO may be amended in the future, or a new BO may be written if there are substantive changes to the EACCS.

For projects where USACE is not the federal lead agency for Section 7 consultation or where Section 10 consultation is required, consistency with the Programmatic BO will enable other federal agencies and nonfederal applicants to streamline their individual ESA consultations by utilizing preapproved mitigation standards and focusing mitigation in conservation priority areas.

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.

Although participation in the EACCS by applicants is voluntary, Alameda County participates in the strategy and considers it to be the best available information when considering the impacts of proposed projects on the full range of protected wildlife, plants, and habitats.

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 2005 issuance of CUP approvals of continued wind energy operations. 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 participating wind companies to achieve a 50% reduction in avian fatalities from an estimated baseline of annual fatalities of four focal species (golden eagle, burrowing owl [*Athene cunicularia*], American kestrel [*Falco sparverius*], and red-tailed hawk [*Buteo jamaicensis*]) through the implementation of the Avian Wildlife Protection Program and Schedule (AWPPS) as established in 2005 and modified in 2007. The 2007 Settlement Agreement and the amended AWPPS required the implementation of various management actions, including seasonal shutdown of turbines and removal of turbines deemed to be "high-risk" turbines, until the 50% reduction goal was achieved. The AWPPS required the establishment of the Alameda County Avian Fatality Monitoring Team (AFMT). The AFMT was charged with developing and implementing—under the supervision and direction of the Scientific Review Committee—a program to monitor turbine-related avian fatality rates and use of the APWRA by birds of management concern. Under the 2007 Settlement Agreement, the emphasis of the AFMT was directed to the four focal species, and its work was central to evaluation of progress toward achieving the 50% reduction goal established by the Settlement Agreement.

As an alternative to the NCCP called for in the Settlement Agreement, the County prepared this PEIR with mitigation measures to provide a framework for review and approval of wind projects in the APWRA and to promote conservation measures to benefit avian species. As described in Section

1.2.4, *Conditional Use Permits*, the County developed a draft *Avian Protection Program* (APP) to provide a framework and process for wind energy projects to address applicable statutes (e.g., MBTA and BGEPA) through the repowering process. The APP provided a broad evaluation of existing environmental conditions, bird use, and avian fatalities in the program area. It focused on avian mortality associated with repowering projects—specifically construction, operation, monitoring, and mitigation. The key provisions of the APP were incorporated into the program-level mitigation measures of this PEIR. Project proponents will be expected to develop project-specific APPs, incorporating mitigation, monitoring, and adaptive management strategies as set forth in this PEIR.

2010 Settlement Agreement

On December 3, 2010, Audubon, CARE, NextEra, the People of the State of California, and the Attorney General entered into a settlement agreement. The repowering schedule in the 2010 Settlement Agreement entailed NextEra repowering old-generation turbines under its current ownership in the APWRA as soon as commercially reasonable, in three or fewer phases, with each phase comprising up to 80 MW and each phase undergoing CEQA review by means of an EIR. Phase 1 was the Vasco Winds project in Contra Costa County; Phases 2 and 3 would be projects in the Alameda County portion of the APWRA. Each phase of repowered turbines is subject to 3 years of postconstruction fatality monitoring, using the focal species identified in the 2007 Settlement Agreement as well as bats as benchmarks for evaluating effectiveness of repowering. The agreement is structured such that each phase of repowering is intended to inform the siting of turbines in subsequent phases. Mitigation fees to compensate for ongoing bird and bat fatalities were also established in the agreement. NextEra is the only wind operator in the APWRA that was a party to the 2010 Settlement Agreement. While the County is not a party to the 2010 Settlement Agreement and therefore has no responsibilities under the agreement, the repowering, conservation, and monitoring measures in the agreement were reviewed and incorporated into the mitigation measures in the PEIR as deemed appropriate by the County.

Environmental Setting

The program area is characterized by rolling hills with elevations ranging from 256 to 1,542 feet above mean sea level. Windfarm operations, livestock grazing and, to a lesser extent, dryland farming (grain crops) are the primary land uses in the program area.

The program area contains 19 land cover types that were mapped during preparation of the EACCS. Land cover types in the program area are listed in Table 3.4-1 and shown in Figure 3.4-1. Land cover types in the Golden Hills and Patterson Pass project areas are listed in Tables 3.4-2 and 3.4-3 and shown in Figures 3.4-2 and 3.4-3, respectively. Mapping resources used for the EACCS included digital orthophotography from 2005 and 2007, previously mapped wetlands from 2001, USFWS wetlands inventory data layer, and field verification surveys conducted by ICF in 2010. Drainage data from U.S. Geological Survey National Hydrography Dataset from 2012 were added to these data sets to create Figures 3.4-1 through 3.4-3. The plant communities and associated wildlife in each land cover type in the program area are described below. Existing turbines may not be present in all land cover types described below; however, all land cover types are described because it is assumed that repowering activities could have impacts on any land cover type within the program area. Land cover types that are present within the Golden Hills or Patterson Pass project areas are so noted in the land cover descriptions below. Most recently, EDF RE conducted habitat assessments for special-status species and a delineation of waters of the United States, including wetlands, that USACE has verified. A report detailing the results of the EDF RE biological survey and wetland delineation is included in Appendix C of this PEIR.

Table 3.4-1. Approximate Acreages of Land Cover Types in the Program Area

Land Cover	Amount in Program Area (acres)
Annual grassland	39,375.79
Alkali meadow/scald	555.06
Rock outcrop	42.05
Northern mixed chaparral/chamise chaparral	28.65
Northern coastal scrub/Diablan sage scrub	74.51
Mixed evergreen forest/oak woodland	582.18
Blue oak woodland	163.61
Foothill pine–oak woodland	21.11
Mixed willow riparian scrub	39.27
Mixed riparian forest and woodland	9.93
Alkali wetland	483.17
Seasonal wetland	82.76
Perennial freshwater marsh	5.01
Canal/Aqueduct	158.21
Ponds	53.74
Reservoirs	176.58
Drainages	Not calculated
Cropland	4.55
Developed and Disturbed	1,502.58
Total	43,358.76

Table 3.4-2. Approximate Acreages of Land Cover Types in the Golden Hills Project Area

Land Cover	Amount in Project Area (acres)
Annual grassland	4,287.08
Alkali meadow/scald	145.69
Mixed willow riparian scrub	6.54
Alkali wetland	37.13
Seasonal wetland	0.09
Ponds	2.89
Drainages	Not calculated
Developed and Disturbed	0.71
Total	4,480.13

Table 3.4-3. Approximate Acreages of Land Cover Types in the Patterson Pass Project Area

Land Cover	Amount in Project Area (acres)
Annual grassland	939.81
Mixed willow riparian scrub	4.00
Seasonal wetland	1.41
Perennial freshwater marsh	4.99
Ponds	0.84
Drainages	0.81
Total	951.86

Grassland

Grassland consists of herbaceous vegetation dominated by grasses, although flowering forbs are often a conspicuous component of the plant cover. Most of the grassland in the program area is characterized as California Annual Grassland. Two other habitats, alkali meadow and rock outcrops, are interspersed as small patches within the grassland matrix and are, accordingly, included in and discussed as components of the grassland habitat.

Grassland Plant Communities

California Annual Grassland

California annual grassland is found throughout the program area, occupying approximately 39,375.79 acres. California annual grassland is an herbaceous plant community dominated by nonnative annual grasses (Holland 1986:36–37; Sawyer and Keeler-Wolf 1995:40–41). The dominant species are mostly nonnative grasses from the Mediterranean basin, such as soft chess (*Bromus hordeaceus*), red brome (*Bromus madritensis* subsp. *rubens*), Mediterranean barley (*Hordeum marinum* var. *gussoneanum*), wild oats (*Avena* spp.), ripgut brome (*Bromus diandrus*), Italian ryegrass (*Festuca perennis* [*Lolium multiflorum*]), and rat-tail fescue (*Festuca myuros*). In the spring, many of the annual grasslands are interspersed with diverse native wildflowers typical of the inner Coast Ranges. Commonly found species of wildflowers in these grasslands include lupine (*Lupinus* spp.), fiddleneck (*Amsinckia* spp.), popcornflower (*Plagiobothrys* spp.), big heronbill (*Erodium botrys*), redstemmed filaree (*E. cicutarium*), California poppy (*Eschscholzia californica*), owl's-clover (*Castilleja* and *Triphysaria* spp.), and clarkia (*Clarkia* spp.). Special-status plant species that may be found in this plant community include large-flowered fiddleneck (*Amsinckia grandiflora*), big tarplant (*Blepharizonia plumosa*), round-leaved filaree (*California macrophylla*), Lemmon's jewelflower (*Caulanthus lemmonii*), diamond-petaled California poppy (*Eschscholzia rhombipetala*), shining navarretia (*Navarretia nigelliformis* ssp. *radians*), and caper-fruited tropidocarpum (*Tropidocarpum capparideum*).

Annual grassland is also the dominant land cover type in the Golden Hills and Patterson Pass projects areas, with annual grassland constituting 96% (4,287.08 acres) and 99% (934.06 acres) of the project areas, respectively.

Alkali Meadow

Alkali meadow occurs in scattered patches totaling approximately 555.06 acres in the central and northern portions of the program area. Alkali meadow is a perennial grassland community that occurs on alkali soils (Holland 1986:42–43; Sawyer and Keeler-Wolf 1995:78–79). Dominant species in alkali meadow include saltgrass (*Distichlis spicata*), wild barley (*Hordeum* spp.), and alkali ryegrass (*Elymus triticoides*). The associated herb cover consists of halophytes, including saltbush (*Atriplex* spp.), alkali heath (*Frankenia salina*), alkali weed (*Cressa truxillensis*), alkali mallow (*Malvella leprosa*), and common spikeweed (*Centromadia pungens*). Alkali meadow is considered a significant natural community by CDFW 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). Special-status plant species that may be found in this plant community include San Joaquin spearscale and recurved larkspur.

Alkali meadow comprises approximately 3% (145.69 acres) of the Golden Hills project area. There is no alkali meadow in the Patterson Pass project area.

Rock Outcrop

Rock outcrops are frequently encountered in some grasslands, and approximately 42.05 acres are present in the program area. These outcrops are exposures of bedrock that typically lack soil and have sparse vegetation. Within the program area, several types of rock outcrops are present and are derived from sedimentary and metamorphic sources. The greatest concentration of rock outcrops occurs near Brushy Peak Regional Preserve, although other rock outcrops are in the vicinity of Tesla Road. One special-status plant species, rayless ragwort (*Packera indecora*), may be found in this plant community.

Common Wildlife Associations

Characteristic wildlife species in grasslands include reptiles such as western fence lizard (*Sceloporus occidentalis*), common garter snake (*Thamnophis sirtalis*), and western rattlesnake (*Crotalis viridis*); mammals such as black-tailed jackrabbit (*Lepus californicus),* California ground squirrel (*Spermophilus beecheyi*), western harvest mouse (*Reithrodontomys megalotis*), California vole (*Microtus californicus*), and coyote (*Canis latrans*); and birds such as red-tailed hawk, American kestrel, barn owl (*Tyto alba*), and western meadowlark (*Sturnella neglecta*). Several common bat species, such as canyon bat (*Parastrellus hesperus*), can roost in rocky outcrops and forage over grassland.

Special-status wildlife species associated with grasslands include golden eagle, Swainson's hawk, western burrowing owl, loggerhead shrike (*Lanius ludovicianus*), San Joaquin kit fox, and American badger (*Taxidea taxus*). California red-legged frog and California tiger salamander use grasslands as movement and aestivation (summer hibernation) habitat. Alameda whipsnake is known to use grasslands adjacent to shrublands and rock outcrops for breeding and refugia. Pallid bat (*Antrozous pallidus*) is known to roost in crevices in rock outcrops and forage over surrounding grassland. Annual grassland also provides important foraging habitat for northern harrier (*Circus cyaneus*) and white-tailed kite (*Elanus leucurus*).

Scrub/Chaparral

Chaparral communities are dominated by densely packed and nearly impenetrable drought-adapted evergreen woody shrubs, 6.5–13 feet tall, that possess small, thick, leathery, sclerophyllous leaves (Hanes 1977:419; Holland 1986:20–21). Coastal scrub communities, in comparison, are generally characterized by low shrubs, usually 1.5–6.5 feet tall with soft non-scerophyllous leaves, and interspersed with grassy openings (Holland 1986). Two scrub/chaparral plant communities are present in the program area: northern mixed chaparral/chamise chaparral and northern coastal scrub/Diablan sage scrub.

Scrub/Chaparral Plant Communities

Northern Mixed Chaparral/Chamise Chaparral

Northern mixed chaparral/chamise chaparral occupies approximately 28.65 acres in the southern end of the program area. Northern mixed chaparral may intermingle with northern coastal scrub/Diablan sage scrub, foothill pine-oak woodlands, and mixed evergreen forest/oak woodland.

Dominant shrubs in this community in the program area include chamise (*Adenostoma fasciculatum*), manzanita (*Arctostaphylos* sp.), scrub oak (*Quercus berberidifolia*), and ceanothus (*Ceanothus* sp.). Other important species are toyon (*Heteromeles arbutifolia*), coffeeberry (*Rhamnus californica*), madrone (*Arbutus menziesii*), California bay (*Umbellularia californica*), birchleaf mountain-mahogany (*Cercocarpus betuloides*), poison-oak (*Toxicodendron diversilobum*), bush monkeyflower (*Mimulus aurantiacus*), and California yerba santa (*Eriodictyon californicum*). Some chaparral stands may be almost entirely composed of dense stands of chamise. No special-status plants occur in this plant community in the program area.

Northern Coastal Scrub/Diablan Sage Scrub

Northern coastal scrub/Diablan sage scrub occupies approximately 74.51 acres in the southern portion of the program area. Northern coastal scrub/Diablan sage scrub in the program area is composed primarily of evergreen shrubs with an herbaceous understory in openings. Northern coastal scrub/Diablan sage scrub communities are dominated by California sagebrush (*Artemisia californica*) and black sage (*Salvia mellifera*), with associated species including coyote brush (*Baccharis pilularis*), toyon, big-berry manzanita (*Manzanita glauca*), California buckwheat (*Eriogonum fasciculatum*), poison-oak, California yerba santa, and bush monkeyflower (Holland 1986:8–10). Rock outcrops are also present in this plant community. No special-status plants occur in this plant community in the program area.

Common Wildlife Associations

Common wildlife species that use chaparral and scrub habitats in the program area include gopher snake (*Pituophis melanoleucus*), western rattlesnake, western fence lizard, brush rabbit (*Sylvilagus bachmani*), California pocket mouse (*Perognathus californicus*), spotted skunk (*Spilogale gracilis*), mule deer, coyote, and bobcat (*Lynx rufus*). Common bird species include mourning dove (*Zenaida macroura*), California quail (*Callipepla californica*), Anna's hummingbird (*Calypte anna*), western scrub-jay (*Aphelocoma californica*), Bewick's wren (*Thryomanes bewickii*), California towhee (*Pipilo crissalis*), lesser goldfinch (*Carduelis psaltria*), fox sparrow (*Passerella iliaca*), white-crowned sparrow (*Zonotrichia leucophrys*), and dark-eyed junco (*Junco hyemalis*).

Special-status wildlife species known to occur in chaparral and northern coastal scrub communities include Alameda whipsnake and loggerhead shrike. Chaparral and northern coastal scrub are the primary habitats for Alameda whipsnake, which breeds, forages, and thermoregulates in this habitat. Contiguous stands are necessary to support viable populations of this species throughout its range. Loggerhead shrikes are known to nest and forage in scrub habitats with low densities of shrub canopy cover.

Woodland

The program area contains three woodland plant communities: mixed evergreen forest/oak woodland, blue oak woodland, and foothill pine-oak woodland. The Golden Hills and Patterson Pass project areas do not support any woodland plant communities.

Woodland Plant Communities

Mixed Evergreen Forest/Oak Woodland

Mixed evergreen forest/oak woodland is the most common woodland community in the program area, occupying approximately 582.18 acres at the south end of the program area. Mixed evergreen forest/oak woodland is characterized by a diverse overstory often dominated by coast live oak (*Quercus agrifolia*) (Holland 1986:86; Sawyer and Keeler-Wolf 1995:241–242). Associated co-dominant species can include blue oak (*Q. douglasii*), valley oak (*Q. lobata*), California bay, madrone, California buckeye (*Aesculus californica*), and black oak (*Q. kelloggii*). Where shrubby, the understory consists of patches of toyon, poison-oak, and scrub oak. Where more open, the understory typically consists of annual grasses and shade-tolerant perennials, such as yerba buena (*Clinopodium douglasii*) and common snowberry (*Symphoricarpos albus*). No special-status plants occur in this plant community in the program area.

Blue Oak Woodland

There are approximately 163.61 acres of blue oak woodland scattered throughout the southern half of the program area. This land cover typically occurs in the low- to mid-elevation hills in slightly drier microclimates. Blue oak woodland is dominated by blue oak, a highly drought-tolerant species adapted to growth on thin soils in the dry foothills. California buckeye and foothill pine (*Pinus sabiniana*) are associated tree species in this community. The understory of blue oak woodland varies from shrubby to open. Understory species typically include annual grasses, hollyleaf cherry (*Prunus ilicifolia*), poison-oak, and coffeeberry. Some blue oak woodland alliances are considered by CDFW to be sensitive communities (California Department of Fish and Game 2010). One special-status plant species, shining navarretia, occurs in this plant community in the program area.

Foothill Pine-Oak Woodland

Foothill pine-oak woodland occupies approximately 21.11 acres in the southern portion of the program area. The canopy is dominated by foothill pine and blue oak (Holland 1986:77). Oaks become more prevalent at lower elevations, often forming a closed canopy layer below the emergent pines, and the understory lacks an appreciable shrub layer. Associated canopy species include interior live oak, coast live oak, and California buckeye. Associated shrub species include ceanothus species, bigberry manzanita, California coffeeberry, poison-oak, silver lupine (*Lupinus albifrons*), blue elderberry, California yerba santa, rock gooseberry (*Ribes quercetorum*), and California redbud (*Cercis occidentalis*). No special-status plants occur in this community in the program area.

Common Wildlife Associations

Characteristic wildlife species that can be found in woodland habitats include gopher snake, western fence lizard, red-tailed hawk, American kestrel, barn owl, great horned owl (*Bubo virginianus*), acorn woodpecker (*Melanerpes formicivorus*), Nuttall's woodpecker (*Picoides nuttallii*), northern flicker (*Colaptes auratus*), white-breasted nuthatch (*Sitta carolinensis*), California quail, spotted towhee (*Pipilo maculatus*), Bewick's wren, bushtit (*Psaltriparus minimus*), big brown bat

(*Eptesicus fuscus*), California myotis (*Myotis californicus*), deer mouse (*Peromyscus maniculatus*), western gray squirrel (*Sciurus griseus*), mule deer, and coyote.

Special-status wildlife species that may be found in oak woodlands include California tiger salamander, Alameda whipsnake, golden eagle, loggerhead shrike, hoary bat, pallid bat, western red bat (*Lasiurus blossevillii*), San Joaquin kit fox, and American badger. California tiger salamanders use burrows in the grassy understory of open woodlands for aestivation and refugia. Alameda whipsnake may use oak woodland for movement between chaparral and coastal scrub habitats. Golden eagles and loggerhead shrikes use valley oak woodland and other woodlands for roosting, nesting, and foraging. Hoary bat, pallid bat, and western red bat roost in woodlands and forage above the canopy, in forest openings, and along forest edges. San Joaquin kit fox and American badger may use open valley oak woodland for denning, foraging, and movement.

Riparian

Within the program area, the riparian land cover type occurs along creeks and around open water bodies. Riparian vegetation in the program area consist of two community types: mixed willow riparian scrub and mixed riparian forest and woodland. At the state level, riparian plant communities are considered sensitive because of the substantial reduction in their amount and range, and for their value as habitat for a large number of plant and wildlife species.

Riparian Plant Communities

Mixed Willow Riparian Scrub

Mixed willow riparian scrub occupies approximately 39.27 acres in and along the margins of the active channel of intermittent and perennial drainages. In the program area, this plant community is found along Patterson Run and drainages north to I-580.

Conditions in the mixed willow riparian scrub community can range from open well-developed canopies with minimal understory to dense areas dominated primarily by understory species with little to no canopy. Yellow willow (*Salix lasiandra*), red willow (*S. laevigata*), arroyo willow (*S. lasiolepis*), and narrowleaf willow (*exigua*) are the dominant canopy species in this habitat. Scrub communities typically consist of scattered willows and mule fat (*Baccharis salicifolia*), which occur in and along the margins of open sandy washes. Understory development in this community type is controlled by canopy density. No special-status plants occur in this plant community in the program area.

Mixed willow riparian scrub comprises approximately 0.1% (6.54 acres) of the Golden Hills project area and 0.4% (4.00 acres) of the Patterson Pass project area.

Mixed Riparian Forest and Woodland

Mixed riparian forest and woodland occupies approximately 9.93 acres in the southern portion of the program area. It occurs along sections of Arroyo Seco along Tesla Road, Arroyo Valle near Hays Camp, Corral Hollow Creek and its tributaries, and Fairchild Gulch and Deadman Gulch in Elyar Canyon.

Mixed riparian forest and woodland communities are similar to mixed willow riparian scrub in terms of habitat requirements. They are found in and along the margins of the active channel on intermittent and perennial drainages. Generally, no single species dominates the canopy, and composition varies with elevation, aspect, hydrology, and channel type. The major canopy species include California sycamore, valley oak, coast live oak, red willow, and California bay. Associated trees and shrubs include California black walnut, other species of willow, California buckeye, Fremont cottonwood, and bigleaf maple. No special-status plants occur in this community in the program area.

Common Wildlife Associations

Wildlife species that are often associated with riparian habitats include amphibians such as Sierran treefrog (*Pseudacris sierrae*), California newt (*Taricha torosa*), western aquatic garter snake (*Thamnophis couchii*), red-shouldered hawk (*Buteo lineatus*), Wilson's warbler (*Wilsonia pusilla*), spotted towhee, Bullock's oriole (*Icterus bullockii*), long-tailed weasel (*Mustela frenata*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), and yuma myotis (*Myotis yumanensis*).

Special-status wildlife species associated with riparian forest and scrub include California red-legged frog, Swainson's hawk, western red bat, Townsend's big-eared bat (*Corynorhinus townsendii*), and hoary bat. California red-legged frogs use riparian habitat types for breeding, foraging, and refugia. Swainson's hawks nest and roost in riparian forest, and hoary and western red bats use this habitat for roosting and foraging. Townsend's big-eared bats are known to forage along riparian corridors when appropriate roost habitat is nearby.

Wetland

The wetland land cover type includes areas subject to seasonal or perennial flooding or ponding, or that possess saturated soil conditions and that support predominantly hydrophytic or "water-loving" herbaceous plant species (Cowardin et al. 1979). Because wetlands are periodically waterlogged, the plants growing in them must tolerate low levels of soil oxygen associated with waterlogged or hydric soils. The presence of flood-tolerant species often indicates that a site is a wetland even if the ground appears to be dry for most of the year, or if hydrologic influences are less obvious.

The wetland land cover type in the program area consists of three communities: alkali wetland, seasonal wetland (including vernal pools), and perennial freshwater marsh. In general, wetlands are considered a sensitive biotic community because of their limited distribution and their importance to special-status plant and wildlife species statewide.

Wetland Plant Communities

Alkali Wetland

Alkali wetlands occupy approximately 483.17 acres in the program area. Alkali wetlands support ponded or saturated soil conditions and occur as perennial or seasonally wet features on alkali soils. Alkali wetlands occur primarily along stream channels where alkali soils are present. In the program area, this plant community occurs along Altamont Creek, the south side of I-580, and in several drainages south of the Alameda/Contra Costa County line and west of Bethany Reservoir. The only site in Alameda County (besides the Springtown Alkali Sink) that supports large areas of alkali soils and intact stands of valley sink scrub and alkali grassland is an area of approximately 267 acres in the northeastern corner of the county. The site occurs near the intersection of Kelso and Bruns Roads between the Delta-Mendota Canal and the California Aqueduct.

The vegetation of alkali wetlands is composed of halophytic plant species adapted to both wetland conditions and high salinity levels. Typical species include salt grass, alkali heath, and common spikeweed. The associated herb cover consists of halophytes, including saltbush, alkali heath, seepweed, alkali weed, and saltmarsh sand spurry (*Spergularia marina*). Stands of iodine bush may also be present. Special-status plant species that occur in this plant community in the program area include brittlescale (*Atriplex depressa*), San Joaquin spearscale (*A. joaquinana*), lesser saltscale (*A. minuscula*), and recurved larkspur (*Delphinium recurvatum*).

Alkali wetland comprises approximately 0.8% (37.13 acres) of the Golden Hills project area. Alkali wetlands are not present in the Patterson Pass project area.

Seasonal Wetlands

Seasonal wetlands occupy approximately 82.76 acres scattered throughout the program area, with several large seasonal wetland complexes (i.e., groups of many small pools or wetlands) occurring along roadways and drainage bottoms in the vicinity of Altamont Pass. This community often occurs adjacent to alkali wetland.

Seasonal wetlands are freshwater wetlands that support ponded or saturated soil conditions during winter and spring and are dry through the summer and fall until fall/winter rainfall begins to saturate the soil. Vernal pools are a type of seasonal wetland that pond water on the surface for extended durations during winter and spring and dry completely during late spring and summer due to an underlying hardpan. This hardpan restricts the percolation of water and creates a "perched" seasonal water source. They support a typical flora largely composed of native wetland plant species. Vernal pools in eastern Alameda County occur in distinctive topography with low depressions mixed with hummocks or mounds. These depressions fill with rainwater and runoff from adjacent areas during the winter and may remain inundated during the spring to early summer. Vernal pools are found east and north of Livermore and northeast of Bethany Reservoir.

Vegetation typically associated with other seasonal wetlands consists of wetland generalists, such as hyssop loosestrife (*Lithium hyssopifolia*), cocklebur (*Xanthium strumarium*), Mediterranean barley, and Italian ryegrass. Upland species such as soft chess, black mustard (*Brassica nigra*), redstemmed filaree, and common tarweed (*Holocarpha virgata*) can also occur. Common species in seasonal wetlands within the project area include watercress (*Rorippa* sp.), water speedwell (*Veronica anagallis-aquatica*), and smartweeds (*Polygonum* spp.). No known occurrences of special-status plants have been documented in this community in the program area. Most of the special-status plants in the program area vicinity do not occur in seasonal wetlands; however, one species—alkali milk-vetch (*Astragalus tener* var. *tener*)—occurs on the margins of alkali vernal pools.

Seasonal wetland comprises approximately 0.02% (0.09 acre) of the Golden Hills project area and 0.1% (1.32 acres) of the Patterson Pass project area.

Perennial Freshwater Marsh

Perennial freshwater marsh occupies approximately 5.01 acres of the program area. Perennial freshwater marsh occurs primarily in small patches along stream courses or drainages and at the edges of some ponds. In the program area, perennial freshwater marsh is present in the northeast portion of the program area near Bruns Road.

Perennial freshwater marsh is dominated by emergent herbaceous plants (reeds, sedges, grasses) with either intermittently flooded or perennially saturated soils (Holland 1986:48–49). In the program area, plant species associated with perennial freshwater marsh include willows, saltgrass, Mediterranean barley, Italian ryegrass, rabbitsfoot grass (*Polypogon* sp.), nutsedge (*Cyperus eragrostis*), willow weed (*Polygonum lapathifolium*), watercress, Baltic rush (*Juncus balticus*), narrow-leaved cattail (*Typha angustifolia*), rice cutgrass (*Leersia oryzoides*), bur-reed (*Sparganium eurycarpum*), alkali bulrush (*Bolboschoenus robustus*), stinging nettle (*Urtica dioica* ssp. *holosericea*), willowherb (*Epilobium ciliatum*), celery-leaved buttercup (*Ranunculus scleratus*), small-flowered saltcedar (*Tamarix parviflora*), and perennial peppergrass (*Lepidium latifolium*). No special-status plants occur in this plant community in the program area.

No perennial freshwater marsh occurs in the Golden Hills project area.

Perennial freshwater marsh comprises approximately 0.5% (4.99 acres) of the Patterson Pass project area.

Common Wildlife Associations

Alkali and seasonal wetlands provide important habitat for a variety of aquatic invertebrates and amphibians, which provide food sources for various bird species. Perennial freshwater marsh is an important habitat for a wide variety of wildlife species. Wildlife species that occur in or use freshwater marsh for breeding or cover include western pond turtle (*Actinemys marmorata*), several garter snake species, great blue heron (*Ardea herodias*), great egret (*Ardea alba),* mallard (*Anas platyrhynchos*), killdeer (*Charadrius vociferus*), greater yellowlegs (*Tringa melanoleuca*), mule deer, and coyote. Seasonal wetlands are commonly used by a variety of wildlife during the wet season, including Sierran treefrog, California toad (*Bufo boreas*), black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), red-winged blackbird (*Agelaius phoeniceu),* white-tailed kite, and northern harrier. Numerous species of bats forage over freshwater wetland, including Mexican free-tailed bat (*Tadarida brasiliensis mexicanus*).

Special-status wildlife species associated with alkali and/or seasonal wetlands include longhorn fairy shrimp, vernal pool shrimp, vernal pool tadpole shrimp, curved-foot hygrotus diving beetle (*Hygrotus curvipes*), California tiger salamander, California red-legged frog, and hoary bat. Longhorn fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp are dependent on ephemeral wetlands such as vernal pools and alkali wetlands. California tiger salamanders use seasonal wetlands that hold water until April or later and perennial freshwater marsh for breeding and larval development. California red-legged frogs use seasonal wetlands and freshwater marsh for refugia and breeding. Perennial freshwater marsh is potential habitat for western pond turtle. Hoary bats forage near or over wetlands.

Aquatic

The aquatic land cover type consists of open water habitats such as reservoirs, rivers, streams, canals, and ponds (including quarry and stock ponds that do not typically support emergent vegetation). Aquatic habitat in the program area comprises canal/aqueducts, ponds, reservoirs, and streams.

Aquatic Plant Communities

Canal/Aqueduct

Canal/aqueduct encompasses approximately 158.21 acres of the program area. Portions of the California Aqueduct and the Delta Mendota Canal, as well as other irrigation canals, are present in the program area. Because these features are intended to move water between areas, they are often managed for minimal vegetation to enhance the flow of water through the channels. Canals and aqueducts typically convey large amounts of water and contain deep water with swift flow year-round. No special-status plants occur in this community in the program area.

Canal/aqueduct is not present in the Golden Hills or Patterson Pass project areas.

Ponds

Ponds occupy approximately 53.74 acres of the program area and were defined as perennial or seasonal water bodies less than 20 acres in size. Ponds are scattered throughout the program area. Ponds may have varying amounts of emergent, submerged, and/or floating vegetation, depending on the length of inundation and level of livestock grazing.

The majority of the ponds in the program area are small stock ponds with little or no vegetation that provide water for livestock. Plants often associated with ponds include floating plants such as duckweed (*Lemna* spp.) or rooted plants such as cattails, bulrushes, sedges, rushes, water cress, and water primrose.

Stock ponds are often surrounded by pasture with grazing livestock. Immediately adjacent to the stock pond, soil may be exposed because of the continued presence of livestock. Stock ponds in ungrazed areas or that have been protected from grazing may be surrounded by wetland vegetation including willows, cattails, reeds, bulrushes, sedges, and tules (*Scirpus californicus*). No special-status plants occur in this community in the program area.

Ponds constitute approximately 0.06% (2.89 acres) of the Golden Hills project area and 0.1% (0.84 acre) of the Patterson Pass project area.

Reservoirs

The reservoir land cover type encompasses approximately 176.58 acres of the program area. Reservoirs were defined as being larger than 20 acres. Reservoirs are open water bodies that are highly managed for water storage, water supply, flood protection, or recreational uses. Bethany Reservoir is the only reservoir in the program area. The reservoir serves as a forebay for the South Bay Pumping Plant and a conveyance facility in this reach of the California Aqueduct.

Plants often associated with reservoirs include those plants common to deep water systems. Algae are the predominant plant life found in the open waters of reservoirs. Depending on reservoir temperature, water level, and other environmental conditions, algal blooms may occur, resulting in thick algal mats on the surface of the reservoir. If the reservoir edges are shallow, plant species similar to those found in ponds may be present. If the reservoir has steeper edges, water depth and fluctuations in reservoir height may prevent the establishment of vegetation. Upland and riparian trees that were not removed during construction of the reservoir or that were planted afterward may be present along the perimeter of the reservoir. No special-status plants occur in this community type in the program area.

Drainages There are numerous perennial, intermittent, and ephemeral drainages in the program area. Because these are linear features, the area of drainage in the program area was not calculated. Major drainages within the program area include Brushy Creek, Altamont Creek, Mountain House Creek, Corral Hollow Creek, and Patterson Run. Larger drainages often have riparian vegetation along them (see the discussion of the riparian land cover type above). The riparian plant composition and width of the riparian corridor vary depending on channel slope, magnitude and frequency of channel and overbank flows, and the frequency/duration of flooding flows that inundate the broader floodplain. Willows may become established in-channel in areas of sediment deposition, unless suppressed by intensive grazing.

Intermittent, ephemeral, and potentially perennial drainages are present in the Golden Hills and Patterson Pass project areas. The acreage of drainages was not calculated for the program area or the Golden Hills project area because no delineation of waters was conducted for these areas.

A wetland delineation was prepared for the Patterson Pass project, and 0.85 acre of drainages was mapped in the Patterson Pass project area as part of the wetland delineation.

Common Wildlife Associations

Open water supports a variety of ducks including mallard, green-winged teal, cinnamon teal (*Anas cyanoptera*), gadwall (*A. strepera*), American wigeon (*A. americana*), and American coot. Many species of common and special-status bats, including yuma myotis and silver-haired bat (*Lasionycteris noctivagans*), forage on emergent aquatic invertebrates and obtain fresh water from open water habitats.

While canals and aqueducts can serve as loafing habitat for some waterfowl species, they generally do not have much habitat value. Because these waterways are so wide and deep, they also create barriers to movement on the landscape for terrestrial species. However, these features may provide the open expanses of water necessary for bat species that drink on the wing and lack the maneuverability to access smaller water sources, such as western mastiff bat (*Eumops perotis*).

Ponds attract many birds that are normally found in the adjacent grasslands; for example, California quail, mourning dove, and barn and cliff swallows (*Hirundo rustica* and *H. pyrrhonota*) all require daily water and 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 are often prevalent wildlife species. Raccoons forage along the edges of ponds for adult and larval amphibians, fish, and crayfish.

Reservoirs provide food for some raptors, which may also nest in nearby trees. Shore and wading birds including killdeer, black-necked stilt, greater yellowlegs, and several gull species may be found in and at the edges of reservoirs. Reservoirs provide habitat for some native fish such as hitch, Sacramento blackfish, California roach, and Sacramento sucker, but more commonly support nonnative fish such as bluegill, sunfish, brown bullhead, carp, goldfish, and largemouth bass. Reservoirs can also provide suitable rearing habitat for nonmigratory rainbow trout if conditions are favorable.

Special-status wildlife species that may be found in or use ponds, streams, the margins of reservoirs, or the inlets where streams flow into reservoirs include California tiger salamander, California red-legged frog, western pond turtle, and tricolored blackbird. Tricolored blackbirds rely on vegetation associated with ponds (cattails and bulrush) for nesting. Western red bat, hoary bat, Townsend's big-eared bat, and silver-haired bat could forage above or drink from canals or aqueducts.

Cropland

Cropland Plant Communities

The cropland land cover type encompasses all areas where the native vegetation has been cleared for irrigated agricultural use or dryland farming. This community does not include rangeland, which is often characterized as an agricultural land use (most rangeland in the program area is classified as annual grassland). Approximately 4.55 acres of cropland is present in the northeast corner of the program area. No special-status plants occur in this land cover type in the program area.

Common Wildlife Associations

Some native wildlife, such as small mammals, certain raptors, and migratory waterfowl, utilize cropland seasonally or year-round. Year-round activity tends to be concentrated along the margins of active farmland where vegetation is less disturbed or where trees and shrubs tend to occur (some are planted deliberately as windbreaks). Open fields that are irrigated for forage crops are also used by wildlife. Cultivated agriculture is bisected by streams, ditches, and channels. Some amphibians and reptiles utilize these linear aquatic features and the adjacent upland habitat.

Special-status wildlife species expected to be found in or along the edges of cropland are burrowing owl, white-tailed kite, loggerhead shrike, Swainson's hawk, and golden eagle. San Joaquin kit foxes and American badgers may move through or forage along the edges of croplands if it occurs near suitable grassland areas. California tiger salamanders and California red-legged frogs may move through croplands to reach suitable breeding and aestivation habitat.

Developed and Disturbed

Approximately 1,502.58 acres of the developed and disturbed land cover type are present in the program area. Developed land comprises all types of development for residential, commercial, industrial, transportation, landfill, landscaping, and recreational uses (e.g., sites with structures, paved surfaces, horticultural plantings, golf courses, and irrigated lawns). Developed and disturbed lands in the program area include ruderal land, urban/suburban development, rural residential, landfill, golf courses/urban parks, and wind turbines and associated infrastructure.

Developed and Disturbed Plant Communities

Ruderal areas are periodically disturbed and are characterized by sparse nonnative, typically weedy vegetation. Most ruderal areas are vacant parcels surrounded by developed areas. Where vegetation is present, ruderal land cover is dominated by a mixture of nonnative annual grasses and weedy species, such as black mustard (*Brassica nigra*), thistles (*Cirsium* spp.), and wild radish (*Raphanus sativa*), that tend to colonize quickly after disturbance.

Vegetation found in other developed lands is usually in the form of lawns, landscaping, and planted street trees (e.g., elm, ash, liquidambar, pine, palm). The rural residential lands may also include small areas of irrigated pasture.

Landfills are highly disturbed areas while in use. After a landfill is closed and capped, it may be returned to natural community types through planting and management.

Common Wildlife Associations

Developed and disturbed areas provide limited habitat for wildlife but are often known to support common urban-dwelling species such as northern mockingbird (*Mimus polyglottos*), rock pigeon (*Columba livia*), mourning dove, house sparrow (*Passer domesticus*), house finch (*Carpodacus mexicanus*), western scrub-jay, Botta's pocket gopher (*Thomomys bottae*), California ground squirrel, house mouse (*Mus musculus*), black rat (*Rattus rattus*), and coyote. Semi-developed areas containing grass, trees, or water sources (small ponds and ditches) may support additional wildlife species. Mexican free-tailed bat is known to form large colonies in urban buildings and bridges, and other common species, such as big brown bat, are found in residential attics and ornamental trees in city parks. These species are typically generalized opportunistic foragers that are highly tolerant of human activity.

While developed landscapes do not provide high-quality habitat for special-status wildlife species, some developed areas may be used for foraging and movement. San Joaquin kit foxes, golden eagles, and loggerhead shrikes may move through and/or forage in ruderal areas, golf courses/urban parks, and ornamental woodlands. Burrowing owls may use ruderal areas, urban/suburban, and golf courses for foraging and breeding. California tiger salamanders and California red-legged frogs may migrate through some developed areas between habitat patches. California tiger salamanders and California red-legged frogs may also use golf courses if ponds are present on or near the golf course and suitable upland habitat is nearby. Some special-status bats may use artificial structures associated with urban landscapes—such as buildings, bridges, and tunnels—for maternity roosts. Pallid bats are known to roost in crevices in bridges or buildings, and Townsend's big-eared bats have been found in open spaces in abandoned buildings, tunnels and other artificial structures.

Special-Status Species

Special-status species are plants and animals 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 species are defined as follows.

- 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.
- Species that are candidates for possible future listing as threatened or endangered under ESA (77 FR 69993, November 21, 2012).
- 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 the CNPPA (California Department of Fish and Wildlife Commission 1900 et seq.).
- Plants with a California Rare Plant Rank of 1A, 1B, 2A, and 2B (California Department of Fish and Wildlife 2013).
- Animals listed as California species of special concern on CDFW's Special Animals List (California Department of Fish and Game 2011).

- 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).
- APWRA focal species.
- Species of local conservation concern in the APWRA.

Special-Status Plants

Thirty-six special status plant species occur in or within 5 miles of the program area (California Department of Fish and Wildlife 2013b) (Table 3.4-4). Twenty-four of the species are not known to occur in the program area (i.e., they occur within the 5-mile radius but not within the program area boundary) and are not discussed further. The following discussion focuses on the 12 species that occur in the program 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 program area, located on Lawrence Livermore Laboratory's Site 300 test area (California Department of Fish and Wildlife 2013b). This occurrence appears to have been extirpated by erosion and has not been observed since 1997 (Carlsen et al. 2012). California annual grasslands in the program area are potential habitat for this species.

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 drainages draining from the inner Coast Range 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 up to 1,055 feet above sea level. Brittlescale has been reported in the program area from scalds in the vicinity of Altamont Pass Road (California Department of Fish and Wildlife 2013b). Potential habitat for this species occurs in alkali wetlands in the program area; alkali wetlands occur in the Golden Hills project area but not in the Patterson Pass project area.

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 drainages draining from the inner Coast Ranges

Table 3.4-4. Special-Status Plant Species Known or with Potential to Occur in the Altamont Pass Wind Repowering Program Area

Common Name *Scientific Name*	Status[a] Federal/ State/CRPR	Distribution	Habitat	Occurrence in Program Area
Sharsmith's onion *Allium sharsmithii*	–/–/1B.3	Mount Hamilton Range	Rocky serpentine slopes, in chaparral or cypress woodland; blooms March–May	Nearest occurrences on Cedar Mountain; program area outside known range of species
Large-flowered fiddleneck *Amsinckia grandiflora*	E/E/1B.1	Historically known from Mount Diablo foothills in Contra Costa, Alameda, and San Joaquin counties; currently known from two natural occurrences	Valley grassland slopes below 1,200 feet; blooms April–May	Occurs in program area
Alkali milk-vetch *Astragalus tener* var. *tener*	–/–/1B.2	Southern Sacramento Valley, northern San Joaquin Valley, east San Francisco Bay Area	Grassy flats and vernal pool margins, on alkali soils; blooms March–June	Nearest occurrences in Livermore Valley, Byron Hot Springs (both occurrences extirpated)
Heartscale *Atriplex cordulata*	–/–/1B.2	Central Valley from Colusa County to Kern County	Alkali grassland, alkali meadow, alkali scrub; blooms May–October	Occurrence records near program area based on misidentifications
Brittlescale *Atriplex depressa*	–/–/1B.2	Western and eastern Central Valley and adjacent foothills on west side of Central Valley	Alkali grassland, alkali meadow, and alkali scrub	Occurs in program area
San Joaquin saltbush *Atriplex joaquiniana*	–/–/1B.2	Eastern San Francisco Bay Area, west edge of Central Valley from Glenn County to Fresno County	Alkali meadow, alkali grassland, saltbush scrub; blooms April–September	Occurs in program area
Lesser saltscale *Atriplex minuscula*	–/–/1B.1	San Joaquin Valley from Merced County to Kern County; Butte County	Alkali sink and sandy alkaline soils in grasslands, between 65–325 feet; blooms May–October	Occurs in program area
Big scale balsamroot *Balsamorhiza macrolepis*	–/–/1B.2	Scattered occurrences in the Coast Ranges and Sierra Nevada foothills	Fields and rocky hillsides, below 2,000 feet; grassland, foothill woodland; blooms March–June	Nearest occurrence in Livermore (occurrence extirpated)
Big tarplant *Blepharizonia plumosa*	–/–/1B.1	Interior Coast Range foothills from Contra Costa County to Stanislaus County	Annual grassland, on dry hills and plains, between 50–1,500 feet; blooms July–October	Occurs in program area
Round-leaved filaree *California macrophylla*	–/–/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	Grasslands, on friable clay soils; blooms; March–May	Occurs in program area

Common Name *Scientific Name*	Status[a] Federal/ State/CRPR	Distribution	Habitat	Occurrence in Program Area
Mount Diablo fairy lantern *Calochortus pulchellus*	–/–/1B.2	Endemic to Contra Costa County	Cismontane woodland; chaparral; blooms April–June	Nearest occurrence in Los Vaqueros watershed
Chaparral harebell *Campanula exigua*	–/–/1B.2	San Francisco Bay region; northern inner south Coast Ranges; Alameda, Contra Costa, San Benito, Santa Clara, and Stanislaus Counties	Rocky areas in chaparral, usually on serpentinite; blooms May–June	Nearest occurrences on Cedar Mountain; program area outside known range of species
Lemmon's jewelflower *Caulanthus lemmonii*	–/–/1B.2	Southeast San Francisco Bay Area, south through the South Coast Ranges and adjacent San Joaquin Valley	Dry exposed slopes in grasslands and pinyon-juniper woodland, between 260–4,000 feet; blooms March–May	Occurs in program area
Congdon's spikeweed *Centromadia parryi* subsp. *Congdonii*	–/–/1B.2	East San Francisco Bay Area, Salinas Valley, Los Osos Valley	Annual grassland, on lower slopes, flats, and swales, sometimes on alkaline or saline soils, below 560 feet; blooms June–November	Occurrence records in program area based on misidentifications
Hispid bird's-beak *Chloropyron molle* subsp. *Hispidum*	–/–/1B.1	Scattered locations in San Joaquin Valley from Solano County to Kern County	Meadow, grassland, playa; on alkaline soils, below 500 feet; blooms June–September	Nearest occurrence in Livermore
Palmate bird's-beak *Chloropyron palmatum*	E/E/1B.1	Livermore Valley and scattered locations in the Central Valley from Colusa to Fresno County	Alkaline grasslands, chenopod scrub; blooms May–October	Nearest occurrence in Livermore
Mount Hamilton thistle *Cirsium fontinale* var. *campylon*	–/–/1B.2	East San Francisco Bay Area	Serpentine seeps and streams; blooms April–October	Nearest occurrences on Cedar Mountain; program area outside known range of species
Livermore tarplant *Deinandra bacigalupii*	–/–/1B.2	Endemic to Alameda County (Livermore Valley)	Alkali grassland; blooms June–October	Nearest occurrence in Livermore
Hospital Canyon larkspur *Delphinium californicum* var. *interius*	–/–/1B.2	Eastern San Francisco Bay Area, northern South Coast Range; Carmel Valley	Moist ravines and slopes in woodlands; blooms March–May	Nearest occurrences south of program area
Recurved larkspur *Delphinium recurvatum*	–/–/1B.2	San Joaquin Valley and interior valleys of the South Coast Ranges, from Contra Costa County to Kern County	Subalkaline soils in annual grassland, saltbush scrub; blooms March–May	Occurs in program area

Common Name *Scientific Name*	Status[a] Federal/ State/CRPR	Distribution	Habitat	Occurrence in Program Area
Diamond-petaled California poppy *Eschscholzia rhombipetala*	–/–/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; blooms March–May	Occurs in program area
Talus fritillary *Fritillaria falcata*	–/–/1B.2	San Francisco Bay Area, Interior South Coast Ranges	Chaparral, oak woodland, coniferous forest, on serpentine talus; blooms March–May	Nearest occurrences on Cedar Mountain; program area outside known range of species
Diablo helianthella *Helianthella castanea*	–/–/1B.2	San Francisco Bay Area	At chaparral/oak woodland ecotone, often in partial shade, on rocky soils, between 80–3,800 feet; blooms April–June	Nearest occurrences on Cedar Mountain
Brewer's dwarf flax *Hesperolinon breweri*	–/–/1B.2	Known only from Contra Costa, Napa, and Solano counties	Serpentine slopes in chaparral and grasslands; blooms May–July	Nearest occurrence in Los Vaqueros watershed
Tehama County western flax *Hesperolinon tehamense*	–/–/1B.3	Northern and central interior North Coast Ranges: Tehama, Glenn Counties	Chaparral, foothill woodland, on serpentine; 100–1,000 m; blooms May–July	Nearest occurrences on Cedar Mountain; no habitat in program area
California hibiscus *Hibiscus lasiocarpus*	–/–/1B.2	Scattered small locations in central California, from Butte to San Joaquin County	Freshwater marsh along rivers and sloughs; blooms August–September	Nearest occurrences near Clifton Court Forebay
Loma Prieta hoita *Hoita strobilina*	–/–/1B.1	San Francisco Bay Area	Oak woodland, riparian woodland, chaparral, on serpentinite; blooms May–October	Nearest occurrence on Cedar Mountain
Mount Hamilton coreopsis *Leptosyne hamiltonii*	–/–/1B.2	Diablo Range	Steep shale talus slopes; blooms March–May	Nearest occurrence on Cedar Mountain
Mason's lilaeopsis *Lilaeopsis masonii*	–/R/1B.1	Sacramento/San Joaquin River delta	Freshwater or brackish marsh, in tidal zone; blooms April–October	Nearest occurrences near Clifton Court Forebay
Delta mudwort *Limosella australis*	–/–/2.1	Contra Costa, Sacramento, San Joaquin, and Solano Counties	Marshes and swamps; blooms May–August	Nearest occurrences near Clifton Court Forebay
Showy madia *Madia radiata*	–/–/1B.1	Scattered populations in the interior foothills of the South Coast Ranges	Oak woodland, grassland; slopes below 3,000 feet; blooms March–May	Nearest occurrences near Corral Hollow

Common Name *Scientific Name*	Status[a] Federal/ State/CRPR	Distribution	Habitat	Occurrence in Program Area
Shining navarretia *Navarretia nigelliformis* subsp. *radians*	–/–/1B.2	Interior foothills of South Coast Ranges from Merced County to San Luis Obispo County	Mesic areas with heavy clay soils, in swales and clay flats; in oak woodland, grassland; between 650–3,300 feet; blooms May–June	Occurs in program area
Hairless popcorn flower *Plagiobothrys glaber*	–/–/1A	Coastal valleys from Marin County to San Benito County	Alkaline meadows; blooms April–May	Nearest occurrence in Livermore (extirpated)
Rayless ragwort *Senecio aphanactis*	–/–/2.2	Scattered locations in Central Western California and Southwestern California, from Alameda County to San Diego County	Oak woodland, coastal scrub; open sandy or rocky areas; blooms January–April	Occurs in program area
Saline clover *Trifolium depauperatum* var. *hydrophilum*	–/–/1B.2	Sacramento Valley, central western California	Salt marsh, mesic alkaline areas in grasslands, vernal pools, below 990 feet (300 m); blooms April–June	Nearest occurrence in Livermore
Caper-fruited tropidocarpum *Tropidocarpum capparideum*	–/–/1B.1	Historically known from the northwest San Joaquin Valley and adjacent Coast Range foothills	Grasslands in alkaline hills below 500 feet; blooms March–April	Occurs in program area

[a] Status explanations:

Federal

– = no status.
E = listed as "endangered" under the federal Endangered Species Act.

State

– = no status.
E = listed as "endangered" under the California Endangered Species Act.
R = listed as "rare" under the California Endangered Species Act.

California Rare Plant Rank

1A = plants presumed extinct in California.
1B = rare, threatened, or endangered in California and elsewhere.
2 = rare, threatened, or endangered in California, but more common elsewhere.
0.1 = seriously endangered in California.
0.2 = fairly endangered in California.
0.3 = not very endangered in California.

foothills. It grows in iodine bush scrub, alkali meadow, and alkali grasslands. It is generally found at low elevations, but has been collected up to 820 feet above sea level. In the program 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). Potential habitat for this species occurs in alkali wetlands in the program area; alkali wetlands occur in the Golden Hills project area but not in the Patterson Pass project area.

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 program area, lesser saltscale has been reported from alkali wetlands along Dyer Road (California Department of Fish and Wildlife 2013b). Potential habitat for this species occurs in alkali wetlands in the program area; alkali wetlands occur in the Golden Hills project area but not in the Patterson Pass project area.

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 program area, big tarplant occurs in the vicinity of Corral Hollow Road and the Midway Substation (California Department of Fish and Wildlife 2013b). Potential habitat for this species occurs in California annual grassland in the program area, including in the Golden Hills and Patterson Pass projects areas.

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 (Alarcón et al. 2012; California Department of Fish and Wildlife 2013b). It occurs in grasslands and open, grassy areas in oak woodland. In the program 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). Potential habitat for this species occurs in California annual grassland in the program area, including the Golden Hills and Patterson Pass projects areas.

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 program area, one occurrence is known from the vicinity of Corral Hollow Road (California

Department of Fish and Wildlife 2013b). Potential habitat for this species occurs in California annual grassland in the program area, including in the Golden Hills and Patterson Pass projects areas.

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 program 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 program area that may provide habitat for recurved larkspur are alkali meadow and alkali wetlands. Alkali wetlands in the Golden Hills project area may provide habitat for recurved larkspur; there are no alkali wetlands in the Patterson Pass project area.

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 program 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). Potential habitat for this species occurs in California annual grassland in the program area, including in the Golden Hills and Patterson Pass projects areas.

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, sometimes in association with drying depressions. In the program 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). Potential habitat for this species occurs in California annual grassland in the program area, including the Golden Hills and Patterson Pass projects areas, and in blue oak woodland, which does not occur in the Golden Hills and Patterson Pass projects areas.

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, on various substrates: clay, coarse sand, rock outcrops (including serpentinite), and soils with high gypsum content or high alkalinity (Preston 2000). In the program 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 program area are potential habitat for this species. Rock outcrops do not occur in the Golden Hills or Patterson Pass projects areas.

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 program area, caper-fruited tropidocarpum is known from a single occurrence near Mountain House (California Department of Fish and Wildlife 2013b). Potential habitat for this species occurs in California annual grassland in the program area, including in the Golden Hills and Patterson Pass projects areas.

Special-Status Wildlife

Based on the USFWS species list (U.S. Fish and Wildlife Service 2013b); CNDDB (California Department of Fish and Wildlife 2013c) records search for the quadrangles overlapping the program area (Altamont, Cedar Mountain, Byron Hot Springs, Clifton Court Forebay, and Midway); and fatality records from APWRA fatality monitoring, 36 special-status wildlife species were identified as having potential to occur in the program area. Of these 35 species, 9 were determined to have low or no potential to occur in the program area and are not discussed further (Table 3.4-5); 26 of the 35 species are known to occur or have a moderate to high likelihood of occurring within the program area because suitable habitat is present (longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle [*Desmocerus californicus dimorphus*], curved-foot hygrotus diving beetle, California tiger salamander, western spadefoot [*Spea hammondii*], California red-legged frog, foothill yellow-legged frog [*Rana boylii*], western pond turtle, Blainville's [coast] horned lizard, Alameda whipsnake, San Joaquin coachwhip [*Masticophis flagellum ruddocki*], white-tailed kite, northern harrier, Swainson's hawk, golden eagle, western burrowing owl, loggerhead shrike, tricolored blackbird, little brown bat, western red bat, hoary bat, pallid bat, American badger, and San Joaquin kit fox). In addition to these 26 species, three species (bald eagle, Townsend's big-eared bat, and silver-haired bat) were added to this table based on suitable habitat conditions and professional judgment. It should be noted that the CNDDB is a presence-only database that depends on voluntary submission of species location data and is not a complete database of species locations.

All wildlife species considered are listed in Table 3.4-5, which presents their regulatory status, distribution, habitat requirements, and a rationale for their potential to occur in the program area. The 29 special-status wildlife species that are known to occur or have a moderate to high potential to occur in the program area are discussed briefly below.

In addition to habitat conditions, APWRA fatality data, and CNDDB data, information from avian use surveys of the program area collected by the AFMT was used to evaluate the potential for special-status birds to occur in the program area and to be potentially adversely affected by construction and operation of new wind turbines. Collection of avian use data was initiated in 2004 and involves sampling avian presence at 70–90 observation points distributed throughout the APWRA for 10–30 minutes at each observation point. The methods used to estimate avian fatality rates and to measure and monitor avian use of the program area are detailed in the *Altamont Pass Wind Resource Area Bird Fatality Study, Bird Years 2005–2011* (ICF International 2013).

Longhorn Fairy Shrimp

Longhorn fairy shrimp is federally listed as endangered. The range of longhorn fairy shrimp is restricted to the eastern edge of the central Coast Ranges. The species has been found in the foothill grasslands west of Tracy, at Kesterson National Wildlife Refuge in Merced County, and near Soda Lake in San Luis Obispo County (Eriksen and Belk 1999:91).

Longhorn fairy shrimp have been found in clear-water depressional pools in sandstone outcrops, in grassland pools, and in pools in valley saltbush scrub. The species has been observed from late December to mid-May in pools that are filled by winter and spring rains. Inhabited pools in sandstone outcrops tend to be very small with clear water and low levels of soluble substances. Clay- and grass-bottomed pools that longhorn fairy shrimp inhabit are clear to fairly turbid. Pools where longhorn fairy shrimp occur are probably short-lived (approximately 3 weeks). Larvae hatch soon after pools fill and water temperature is approximately 10°C. Longhorn fairy shrimp need water temperatures of 15–20°C to attain maturity. Maturation is achieved in 23 days under optimal conditions, but 43 days is more typical (Eriksen and Belk 1999:91-92).

In the program area, seasonal wetlands and rock outcrops provide suitable habitat for longhorn fairy shrimp. There is one CNDDB record for an occurrence of longhorn fairy shrimp in the northeast portion of the program area (California Department of Fish and Wildlife 2013c). There is an additional record for an occurrence of longhorn fairy shrimp within 0.5 mile north of the program area. Longhorn fairy shrimp is also known to occur near the program area at Brushy Peak Preserve (U.S. Fish and Wildlife Service 2007:3). Critical habitat for longhorn fairy shrimp is located in the northwest portion of the program area (Figure 3.4-4).

Grass-bottom seasonal pools and rock outcrop pools that are suitable for longhorn fairy shrimp may be present within the Golden Hills project area. One seasonal wetland in the Patterson Pass project area provides suitable habitat for longhorn fairy shrimp. Although rock outcrops are present in the Patterson Pass project area, they do not contain suitable pool habitat for longhorn fairy shrimp. There are no CNDDB records for occurrences of longhorn fairy shrimp in either of the project areas (California Department of Fish and Wildlife 2013c). There is no designated critical habitat for longhorn fairy shrimp in the Golden Hills or Patterson Pass project areas (Figure 3.4-4).

Vernal Pool Fairy Shrimp

Vernal pool fairy shrimp is federally listed as threatened. The species is found from Shasta County in the north throughout the Central Valley to Tulare County and west to the central Coast Ranges. Disjunct populations occur in San Luis Obispo, Santa Barbara, and Riverside Counties (Eriksen and Belk 1999:92, 125). Vernal pool fairy shrimp inhabit sandstone depression pools and vernal pools in grassland habitats. Vernal pool fairy shrimp are most commonly found in grass or mud-bottomed swales, earth slumps, or basalt-flow depression pools in unplowed grasslands (Eng et al. 1990:257). The chemical composition of the habitat and water temperature variations resulting from pools filling at different times and distribution of pools along altitudinal and longitudinal gradients are the most important factors in determining the distribution of different species of fairy shrimp (Eng et al. 1990:273). Vernal pool fairy shrimp also occur in other wetlands that provide habitat characteristics similar to those of vernal pools; these other wetlands include alkaline rain pools, rock outcrop pools, and some disturbed and constructed sites (59 FR 48136–48153, September 16, 1994; Eriksen and Belk 1999:93). Occupied habitats range in size from 6-square-foot puddles to pools exceeding 24 acres. Suitable pools must stay inundated long enough for vernal pool fairy shrimp to complete their life cycle, which typically takes 3–6 weeks (Eriksen and Belk 1999:93). Vernal pool fairy shrimp is

Common Name *Scientific Name*	Status Federal/State/ Other	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Program Area
Invertebrates				
Conservancy fairy shrimp *Branchinecta conservatio*	E/–/–	Disjunct occurrences in Solano, Merced, Tehama, Ventura, Butte, and Glenn Counties	Large, deep vernal pools in annual grasslands	Low—suitable habitat may be present but not known to occur in Alameda County.
Longhorn fairy shrimp *Branchinecta longiantenna*	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	High—suitable habitat present in the program area; known population at Brushy Peak Preserve near program area; designated critical habitat for the species overlaps with a small portion of the program area.
Vernal pool fairy shrimp *Branchinecta lynchi*	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	High—alkali and seasonal wetlands in the program area provide potential habitat for the species; occurrences known in program area.
Vernal pool tadpole shrimp *Lepidurus packardi*	T/–/–	Shasta County south to Merced County	Vernal pools and ephemeral stock ponds	High—program area is within the species known range and stock ponds and alkali wetlands in the program area provide potential habitat for the species. Not known to occur in program area.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	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.	Moderate—project area supports elderberry shrubs, but no CNDDB occurrences in program area.
Curved-foot hygrotus diving beetle *Hygrotus curvipes*	–/–/–	Kellogg Creek watershed and one site near Oakley, Contra Costa County and Alameda County	Aquatic; small seasonal pools and wetlands and small pools left in dry creek beds, associated with alkaline-tolerant vegetation	High—suitable habitat in program area; several CNDDB occurrences in northwestern portion of program area.

Common Name *Scientific Name*	Status Federal/State/ Other	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Program Area
Fish				
Green sturgeon *Acipenser medirostris*	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 no suitable habitat in the program area.
Delta smelt *Hypomesus transpacificus*	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—outside of species known range.
Central California Coast steelhead *Oncorrhynchus mykiss*	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—outside of species known range and no suitable habitat in the program area.
Central Valley steelhead *Oncorrhynchus mykiss*	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 program area.
Central Valley spring-run Chinook salmon *Oncorhynchus tshawytscha*	T/T/–	Upper Sacramento River and tributaries of Feather and Yuba Rivers	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 8.0 to 12.5°C. Habitat types are riffles, runs, and pools. Coldwater pools are needed for holding adults (Moyle 2002.)	None—outside of species known range.
Sacramento River winter-run Chinook salmon *Oncorhynchus tshawytscha*	E/E/–	Mainstem Sacramento River below Keswick Dam (Moyle 2002)	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 8.0 to 12.5°C. Habitat types are riffles, runs, and pools. (Moyle 2002.)	None—outside of species known range.

Common Name *Scientific Name*	Status Federal/State/ Other	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Program Area
Amphibians				
California tiger salamander *Ambystoma californiense*	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 breeding and larval development; rodent burrows, rock crevices, or fallen logs for cover for adults and juveniles for summer dormancy.	High—species has been documented at numerous locations within and near the program area. All upland and suitable aquatic habitats within the program area are considered potentially occupied.
Western spadefoot *Spea hammondii*	–/SSC/–	Sierra Nevada foothills, Central Valley, Coast Ranges, coastal counties in southern California	Shallow streams with riffles; seasonal wetlands, such as vernal pools in annual grasslands and oak woodlands	High—program area is within the species known range and suitable habitat is present in the program area.
California red-legged frog *Rana draytonii*	T/T/–	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, soil cracks, or downed logs during dry periods	High—species has been documented at numerous locations within and near the program area; all upland and suitable aquatic habitats within the program area are considered potentially occupied. The program area is entirely within designated critical habitat for the species.
Foothill yellow-legged frog *Rana boylii*	–/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.	Moderate—streams within the program area that contain suitable substrate and cover could support the species; CNDDB records for occurrences within 2 miles of the program area.

Common Name *Scientific Name*	Status Federal/State/ Other	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Program Area
Reptiles				
Western pond turtle *Actinemys marmorata*	–/SSC/–	The western pond turtle is 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.	High—suitable aquatic and upland nesting habitat in the program area; table habitat; known to occur in and near the program area.
Blainville's (Coast) horned lizard *Phrynosoma blainvillii*	–/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	High—suitable habitat (grassland and woodland) is present throughout the program area although suitable substrate conditions may not be present throughout the program area; known to occur in and near the program area.
Silvery legless lizard *Anniella pulchra*	–/SSC/–	Along the Coast, Transverse, and Peninsular Ranges from Contra Costa County to San Diego County with spotty occurrences in the San Joaquin Valley; elevation range extends from sea level to about 5,100 feet.	Occurs in moist warm loose soil with plant cover. Moisture is essential. Habitat consist of sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks. Leaf litter under trees and bushes in sunny areas, and dunes stabilized with bush lupine and mock heather often indicate suitable habitat. Use surface objects such as rocks, boards, driftwood, and logs for cover.	Low—limited suitable habitat in program area and soil moisture conditions unlikely.

Common Name *Scientific Name*	Status Federal/State/ Other	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Program Area
Giant garter snake *Thamnophis gigas*	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—program area is outside of species range except for extreme northeast corner of program; no suitable habitat is present in the program area and no nearby occurrences.
Alameda whipsnake *Masticophis lateralis euryxanthus*	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	High—suitable grassland habitat is present throughout the program area but vegetation associations (scrub and chaparral) and rock outcrops are more limited; known to occur in and near the program area. Designated critical habitat for the species overlaps a portion of the program area.
San Joaquin coachwhip *Masticophis flagellum ruddocki*	–/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 to 900 meters.	Occurs in open, dry, vegetative associations with little or no tree cover. It occurs in valley grassland and saltbush scrub associations. Often occurs in association with mammal burrows	High—suitable grassland habitat is present within the program area; known to occur in and near the program area.

Common Name *Scientific Name*	Status Federal/State/ Other	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Program Area
Birds				
White-tailed kite *Elanus leucurus*	–/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 program area and is likely to forage in the program area. Large trees suitable for nesting are limited.
Bald eagle *Haliaeetus leucocephalus*	P/E, FP/–	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	Moderate—suitable nesting and foraging habitat present at Bethany Reservoir; not known to occur in the program area but may nest, forage, or move through it.
Northern harrier *Circus cyaneus*	–/SSC/–	Throughout lowland California; has been recorded in fall at high elevations	Grasslands, meadows, marshes, and seasonal and agricultural wetlands providing tall cover	High—suitable nesting and foraging habitat is present throughout the program area; known to occur in the program area.
Swainson's hawk *Buteo swainsoni*	–/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 program area but is largely a Central Valley species and is less likely to forage in the program area. Large trees suitable for nesting are limited.
Golden eagle *Aquila chrysaetos*	P/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—suitable nesting and foraging habitat present; known to occur in program area.

Common Name *Scientific Name*	Status Federal/State/ Other	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Program Area
Western burrowing owl *Athene cunicularia*	–/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—suitable nesting and foraging habitat is present throughout the program area; numerous known occurrences throughout the program area.
Loggerhead shrike *Lanius ludovicianus*	–/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—suitable nesting and foraging habitat present; known to occur in program area; nesting habitat is limited to areas that support shrubs and trees.
Tricolored blackbird *Agelaius tricolor*	–/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	High—suitable nesting and foraging habitat present; known to occur in program area; nesting habitat is limited to areas that support larger expanses of emergent freshwater marsh and blackberry.
Mammals				
Little brown bat *Myotis lucifugus*	–/–/WBWG Moderate	Found throughout the northern portion of California, primarily at higher elevations.	Often associated with coniferous forest. Requires nearby water. Roosts in hollow trees, rock outcrops, buildings, and occasionally mines and caves.	High— may roost, forage or drink in the program area. Assuming identification was correct, this species has been documented in fatality records at APWRA.
Silver-haired bat *Lasionycteris noctivagans*	–/–/WBWG Moderate	Found from the Oregon border south along the coast to San Francisco Bay and along the Sierra Nevada and Great Basin region to Inyo County. Also occurs in southern California from Ventura and San Bernardino Counties. south to Mexico. Has been recorded in Sacramento, Stanislaus, Monterey and Yolo Counties	During spring and fall migrations the silver-haired bat may be found anywhere in California. Summer habitats include coastal and montane coniferous forests, valley foothill woodlands, pinyon-juniper woodlands, and valley foothill and montane riparian habitats. Roosts in hollow trees, snags, buildings, rock crevices, caves, and under bark.	Moderate—may roost, forage or drink in the program area; few fatality records from windfarms in the Delta, approximately 25 miles north/northwest. This species has been acoustically documented at a neighboring wind farm (Pandion 2010).

Common Name *Scientific Name*	Status Federal/State/ Other	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Program Area
Western red bat *Lasiurus blossevillii*	–/SSC/WBWG High	Coastal areas from the San Francisco Bay area south, plus the Central Valley and surrounding foothills, with a limited number of records from southern California, extending as far east as western Riverside and central San Diego counties, upper Sacramento River near Dunsmuir, Siskiyou County.	Found primarily in riparian and wooded habitats. Occurs at least seasonally in urban areas. Day roosts in trees within the foliage. Found in fruit orchards and sycamore riparian habitats in the Central Valley.	High—may roost, forage or drink in the program area. Documented in fatality record at APWRA.
Hoary bat *Lasiurus cinereus*	–/–/WBWG Moderate	Occurs throughout California from sea level to 13,200 feet. Statewide in wooded areas. Winter in southern California.	Primarily roosts in forested habitats. Also found in riparian areas and in park and garden settings in urban areas. Day roosts within foliage of trees.	High—may roost, forage or drink in the program area. Documented in fatality record at APWRA.
Townsend's big-eared bat *Corynorhinus townsendii*	–/SSC/WBWG High	Widespread throughout California, from low desert to mid-elevation montane habitats.	Roosts in caves, tunnels, mines, buildings, and other cave-like spaces. Will night roost in more open settings, including under bridges.	Moderate—May roost in caves or structures within or adjacent to the program area; could forage or drink within program area.
Pallid bat *Antrozous pallidus*	–/SSC/WBWG High	Occurs throughout California except the high Sierra from Shasta to Kern County and the northwest coast, primarily at lower and mid elevations (up to 6,000 feet).	Occurs in a variety of habitats from desert to coniferous forest. Most closely associated with oak, mixed conifer, redwood, and giant sequoia habitats in northern California and oak woodland, grassland, and desert scrub in southern California. Relies heavily on trees for roosts but also uses caves, mines, bridges, and buildings.	High— may roost, forage or drink in the program area; one record for an occurrence within 5 miles of the program area (California Department of Fish and Wildlife 2013b).

Common Name *Scientific Name*	Status Federal/State/ Other	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Program Area
American badger *Taxidea taxus*	–/SSC	In California, badgers occur throughout the state except in humid coastal forests of northwestern California in Del Norte and Humboldt Counties	Occurs 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 throughout the program area; known to occur within and near the program area.
San Joaquin kit fox *Vulpes macrotis mutica*	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.	High—suitable grassland habitat is present throughout the program area; although recent sightings are limited, the species has been documented at several localities within and near the program area.

[a] Status explanations:

Federal

E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.
– = no listing.

State

E = listed as endangered under the California Endangered Species Act.
T = listed as threatened under the California Endangered Species Act.
FP = fully protected under the California Fish and Game Code.
SSC = species of special concern in California.
– = no listing.

Other

Western Bat Working Group (WBWG) Priority

High = species are imperiled or at high risk of imperilment.
Moderate = this designation indicates a level of concern that should warrant closer evaluation, more research, and conservation actions of both the species and possible threats. A lack of meaningful information is a major obstacle in adequately assessing these species' status and should be considered a threat.

not found in riverine, marine, or other permanent waters (59 FR 48136–48153, September 16, 1994).

Alkali and seasonal wetlands in the program area provide suitable habitat for vernal pool fairy shrimp. There is one CNDDB record for an occurrence of vernal pool fairy shrimp in the northwest portion of the program area and five additional records for occurrences that are west, north, and northeast of the program area (California Department of Fish and Wildlife 2013c). There is no designated critical habitat for vernal pool fairy shrimp within the program area (Figure 3.4-4).

Alkali and seasonal wetlands that provide suitable habitat for vernal pool fairy shrimp may be present within the Golden Hills project area; however, habitat surveys have not been conducted. One seasonal wetland in the Patterson Pass project area provides suitable habitat for vernal pool fairy shrimp. There are no CNDDB records for occurrences of vernal pool fairy shrimp in either of the project areas (California Department of Fish and Wildlife 2013c).

Vernal Pool Tadpole Shrimp

Vernal pool tadpole shrimp is federally listed as endangered. This species is a California Central Valley endemic species, with the majority of populations in the Sacramento Valley. Vernal pool tadpole shrimp has also been reported from the Sacramento River Delta east of San Francisco Bay and from scattered localities in the San Joaquin Valley from San Joaquin to Madera Counties (Rogers 2001:1002).

Vernal pool tadpole shrimp occur in a wide variety of seasonal habitats including vernal pools, ponded clay flats, alkaline pools, ephemeral stock tanks, and roadside ditches. Habitats where vernal pool tadpole shrimp have been observed range in size from small (less than 25 square feet), clear, vegetated vernal pools to highly turbid alkali scald pools to large (more than 100 acres) winter lakes (Helm 1998:134–138; Rogers 2001:1002–1005). These pools and other ephemeral wetlands must dry out and be inundated again for the vernal pool tadpole shrimp cysts to hatch. This species has not been reported in pools that contain high concentrations of sodium salts, but may occur in pools with high concentrations of calcium salts (Helm 1998:134–138; Rogers 2001:1002–1005).

Seasonal wetlands and ephemeral ponds in the program area that remain inundated for a minimum of 6–8 weeks would provide suitable habitat for vernal pool tadpole shrimp. Although there are no CNDDB records for occurrences of vernal pool tadpole shrimp in the program area (California Department of Fish and Wildlife 2013c), the program area is located within their known range. There is no designated critical habitat for vernal pool tadpole shrimp within the program area.

Seasonal wetlands and ephemeral ponds that provide suitable habitat for vernal pool tadpole shrimp may be present within the Golden Hills project area. One area of perennial freshwater marsh in the Patterson Pass project area provides suitable habitat for vernal pool tadpole shrimp. There are no CNDDB records for occurrences of vernal pool tadpole shrimp in either of the project areas (California Department of Fish and Wildlife 2013c).

Valley Elderberry Longhorn Beetle

Valley elderberry longhorn beetle is federally listed as threatened. On October 2, 2012, USFWS proposed to remove valley elderberry longhorn beetle from the federal list of endangered and threatened species (77 FR 60237–60276). The proposed rule, if made final, would also remove the designation of critical habitat for the subspecies. The public comment period on the proposed delisting ended December 3, 2012, and was extended through January 23, 2013 (78 FR 4812–4813).

USFWS will review comments and make a final determination on the proposed rule. There is no official time period for this determination; until it is made, the beetle retains its protected status and critical habitat designation.

The current known range of valley elderberry longhorn beetle extends throughout California's Central Valley and associated foothills from about the 3,000-foot contour on the east and the watershed of the Central Valley on the west (U.S. Fish and Wildlife Service 1999:1). Valley elderberry longhorn beetle is dependent on its host plant, elderberry, which is a common component of riparian corridors and adjacent upland areas in the Central Valley (Barr 1991:5).

Valley elderberry longhorn beetle has four stages of life: egg, larva, pupa, and adult. Females deposit eggs on or adjacent to the host elderberry. Egg production varies; females have been observed to lay between 16 and 180 eggs. Eggs hatch within a few days of being deposited. Larvae emerge and bore into the wood of the host plant, creating a long feeding gallery in the pith of the elderberry stem. The larvae feed on the pith of the plant for 1–2 years. When a larva is ready to pupate, it chews an exit hole to the outside of the stem and then plugs it with frass. The larva then retreats into the feeding gallery and constructs a pupal chamber from wood and frass. The larvae metamorphose between December and April; the pupal stage lasts about a month. The adult remains in the chamber for several weeks after metamorphosis and then emerges from the chamber through the exit hole. Adults emerge between mid-March and mid-June, the flowering season of the plant. Adults feed on elderberry leaves and mate within the elderberry canopy (Talley et al. 2006: 7-9).

Elderberry shrubs in the program area provide suitable habitat for valley elderberry longhorn beetle. Elderberry shrubs may be associated with the mixed riparian forest and woodland, mixed willow riparian scrub, blue oak woodland, foothill pine-oak woodland, mixed evergreen forest oak woodland, and grassland land cover types. There are no CNDDB records for occurrences for valley elderberry longhorn beetle in the program area. The closest record is for three adults observed at Lawrence Livermore National Laboratory Site 300 (California Department of Fish and Wildlife 2013c).

Elderberry shrubs may be present in the Golden Hills project area and would provide suitable habitat for valley elderberry longhorn beetle. Elderberry shrubs may be associated with the mixed willow riparian scrub and grassland land cover types. An ICF biologist found 39 elderberry shrubs in the Patterson Pass project area during a survey to assess habitats for special-status species in November 2013. Several of the shrubs had valley elderberry longhorn beetle exit holes.

Curved-Footed Hygrotus Diving Beetle

Curved-footed hygrotus diving beetle does not have any state or federal status but is considered rare under CEQA. In the November 15, 1994 Notice of Review (50 FR 58982–59028), USFWS concluded that curved-foot hygrotus diving beetle was possibly appropriate for listing as threatened or endangered but lacking persuasive data to support a proposal for listing. Its status trend was listed as unknown.

The known range of the curved-foot hygrotus diving beetle is limited to Contra Costa and Alameda Counties (California Department of Fish and Wildlife 2013c). Little information is available for the curved-foot hygrotus diving beetle. The species is known to inhabit vernal and seasonal pools and wetlands (Essig Museum of Entomology 2013), as well as stock ponds, irrigation canals, roadside ditches, pools in creeks and creeks with slow flows (California Department of Fish and Wildlife 2013c). Both larval and adult life stages are predaceous and, like other species in the family, winged adults can disperse between habitats (Powell and Hogue 1979). Reasons for decline of the species include loss of habitat to development and non-target effects of mosquito control (Essig Museum of Entomology 2013).

Seasonal wetlands, ponds, and some creeks in the program area may provide suitable habitat for curved-footed hygrotus diving beetle. There are three CNDDB records for occurrences of curved-footed hygrotus diving beetle in the northwest portion of the program area and eight additional records for occurrences that are west, north, and east of the program area (California Department of Fish and Wildlife 2013c).

Seasonal wetlands, ponds, and some creeks may provide suitable habitat for curved-footed hygrotus diving beetle in the Golden Hills project area. Ponds and some creeks may provide suitable habitat for this beetle in the Patterson Pass project area. There are no CNDDB records for occurrences of curved-footed hygrotus diving beetle in either of the project areas; however one of the occurrences in the program area is just outside of the Golden Hills project area (California Department of Fish and Wildlife 2013c).

California Tiger Salamander

The Central California distinct population segment of California tiger salamander (which overlaps with the program area) is federally listed as threatened (50 CFR 47212–47248, August 4, 2004). California tiger salamander is also state-listed as threatened (California Department of Fish and Game 2011).

California tiger salamander is endemic to the San Joaquin–Sacramento River valleys, bordering foothills, and coastal valleys of central California (Barry and Shaffer 1994:159). California tiger salamander is a lowland species restricted to grasslands and low foothill regions where its breeding habitat occurs (Jennings and Hayes 1994:14). Breeding habitat consists of temporary ponds or pools, slower portions of streams, and some permanent waters (Stebbins 2003:153–154). Permanent aquatic sites are unlikely to be used for breeding unless they lack fish predators (Jennings and Hayes 1994:14). California tiger salamanders also require dry-season refuge sites in the vicinity of breeding sites (within 1 mile) (Jennings and Hayes 1994:14). California ground squirrel (*Spermophilus beecheyi*) burrows are important refuge sites for adults and juveniles (Loredo et al. 1996:283–284).

Adult California tiger salamanders move from subterranean refuge sites to breeding pools during relatively warm late winter and spring rains (Jennings and Hayes 1994:12). Breeding generally occurs from December through March (Stebbins 2003:154). Development through metamorphosis requires 3–6 months (69 FR 47215). Metamorphosed juveniles leave their ponds in the late spring or early summer and move to terrestrial refuge sites before seasonal ponds dry (Loredo et al. 1996:282). However, in late fall 1993, one larval overwintering salamander was observed in Monterey County and many overwintering salamanders were observed in three perennial stock ponds in Contra Costa County from 1998 to 2001 (Alvarez 2004:344).

Ponds, longer lasting seasonal wetlands, and portions of drainages in the program area may provide suitable breeding habitat for California tiger salamander, and surrounding grasslands and oak woodland provide suitable upland refuge and dispersal habitat. There are numerous (more than 20) CNDDB records for occurrences of California tiger salamander in the program area. The majority of these occurrences are in the northern portion of the program area. There are more than 70 additional records for occurrences of California tiger salamander surrounding the program area

(California Department of Fish and Wildlife 2013c). There is no designated critical habitat for California tiger salamander in the program area.

Ponds and pooled portions of drainages in the Golden Hills and Patterson Pass project areas provide suitable breeding habitat for California tiger salamander, and surrounding grasslands provide suitable upland refuge and dispersal habitat. Longer lasting seasonal wetlands in the Golden Hills project area may also provide suitable habitat for California tiger salamander. There are CNDDB records for occurrences of California tiger salamander in both project areas (California Department of Fish and Wildlife 2013c).

Western Spadefoot

Western spadefoot is a California species of special concern. Western spadefoot is a lowland toad that occurs in washes, river floodplains, alluvial fans, playas, and alkali flats within valley and foothill grasslands, open chaparral, and pine-oak woodlands. It breeds in quiet streams and temporary rain pools. Western spadefoot prefers habitats with open vegetation and short grasses where the soil is sandy or gravely (Stebbins 2003:203). Western spadefoot toads spend a considerable portion of the year underground in burrows (Zeiner et al. 1988:56). Depending on temperature and rainfall, egg laying occurs between late February and late May. Eggs hatch within 6 days, and larval development can be completed within 3–11 weeks (Jennings and Hayes 1994:94) Recently metamorphosed toads disperse after spending a few hours or days at the pond margin (Zeiner et al. 1988:56).

Seasonal wetlands, pooled portions of drainages, and ephemeral ponds in the program area that remain inundated for a minimum of 4 weeks would provide suitable habitat for western spadefoot. Although there are no CNDDB records for occurrences of western spadefoot in the program area (California Department of Fish and Wildlife 2013c), the program area is within their known range.

Seasonal wetlands, pooled portions of drainages, and ephemeral ponds that provide suitable habitat for western spadefoot may be present in the Golden Hills project area. One seasonal wetland and two pooled areas in a drainage provide suitable habitat for western spadefoot in the Patterson Pass project area. There are no CNDDB occurrences of western spadefoot in either of the project areas (California Department of Fish and Wildlife 2013c).

California Red-Legged Frog

California red-legged frog is a California species of special concern and is federally listed as threatened. The taxon is known from isolated locations in the Sierra Nevada, North Coast, and northern Transverse Ranges. It is relatively common in the San Francisco Bay Area and along the central coast. California red-legged frog is believed to be extirpated from the floor of the Central Valley (U.S. Fish and Wildlife Service 2002a:5).

California red-legged frogs use a variety of habitats; these include various aquatic, riparian, and upland habitats (U.S. Fish and Wildlife Service 2002a:12). However, California red-legged frogs may complete their entire life cycle in a pond or other aquatic site that is suitable for all life stages (66 FR 14626). California red-legged frogs inhabit marshes; streams; lakes; ponds; and other, usually permanent, sources of water that have dense riparian vegetation (Stebbins 2003:225). Habitat consists of deep (at least 2.5 feet) still or slow-moving water with shrubby riparian vegetation (willows [*Salix* sp.], tules [*Scirpus* sp.], or cattails [*Typha* sp.]) (Jennings and Hayes 1994:64). California red-legged frogs are highly aquatic and spend the majority of their lives in the riparian zone (Brode and Bury 1984:32). Adults may take refuge during dry periods in rodent holes or leaf litter in riparian habitats (U.S. Fish and Wildlife Service 2002a:14).

California red-legged frogs breed from November through April and typically lay their eggs in clusters around aquatic vegetation (U.S. Fish and Wildlife Service 2002a:16). Larvae undergo metamorphosis between July and September, 3.5–7 months after hatching (66 FR 14626). However, larvae have been observed to take more than 1 year to complete metamorphosis in four counties in central coast California (Fellers et al. 2001:156).

Ponds, perennial marsh, seasonal wetlands, drainages, and mixed willow riparian scrub in the program area provide suitable breeding and/or foraging/dispersal habitat for California red-legged frog, and surrounding grasslands and oak woodland provide suitable upland refuge and dispersal habitat. There are numerous (more than 40) records for occurrences of California red-legged frog throughout the program area. There are many additional CNDDB records for occurrences of California red-legged frog surrounding the program area (California Department of Fish and Wildlife 2013c). The entire program area is within designated critical habitat for California red-legged frog.

Ponds, perennial marsh, seasonal wetlands, drainages, and mixed willow riparian scrub within the Golden Hills and Patterson Pass project areas provide suitable breeding and/or foraging/dispersal habitat for California red-legged frog, and surrounding grasslands provide suitable upland refuge and dispersal habitat. There are CNDDB records for occurrences of California red-legged frog in both project areas (California Department of Fish and Wildlife 2013c). The Golden Hills and Patterson Pass project areas are located entirely within designated critical habitat for California red-legged frog (Figure 3.4-4).

Foothill Yellow-Legged Frog

Foothill yellow-legged frog is designated as a California species of special concern. Historically, foothill yellow-legged frogs occurred in the coastal foothills and mountains from the Oregon border south to Los Angeles County and in the Sierra Nevada foothills south to Kern County (Zweifel 1955:215; Stebbins 2003:232). The current range excludes coastal areas south of northern San Luis Obispo County and foothill areas south of Fresno County where the species is apparently extirpated (Jennings and Hayes 1994:67–69). The species can occur from sea level to 6,000 feet above sea level (Stebbins 2003:232). Foothill yellow-legged frogs occupy rocky drainages in valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadow types of habitat (Zeiner et al. 1988:86). The streambed is usually gravelly or sandy and the stream gradient is generally not steep (Zweifel 1955:221). Foothill yellow-legged frogs are typically found near water, especially near riffles with rocks nearby and sunny banks (Stebbins 2003:232). Foothill yellow-legged frogs are active from late February or early March through summer and into the fall (Zweifel 1955:226). The species breeds from mid-March to May after the high-water stage in streams has passed and less sediment is being conveyed (Stebbins 1954:130).

Perennial and intermittent drainages and mixed willow riparian scrub in the program area may provide suitable habitat for foothill yellow-legged frog. There are no CNDDB records for occurrences of foothill yellow-legged frog within the program area; however there are two records for occurrences that are south and southwest of the program area (California Department of Fish and Wildlife 2013c).

Perennial and intermittent drainages and mixed willow riparian scrub in the Golden Hills and Patterson Pass project areas may provide suitable habitat for foothill yellow-legged frog. There are no CNDDB records for occurrences of foothill yellow-legged frog in either of the project areas (California Department of Fish and Wildlife 2013c).

Western Pond Turtle

Western pond turtle is a California species of special concern. In California, the range is discontinuously distributed throughout the state west of the Cascade-Sierran crest (Jennings and Hayes 1994:99). Aquatic habitats used by western pond turtles include ponds, lakes, marshes, rivers, streams, and irrigation ditches with a muddy or rocky bottom in grassland, woodland, and open forest areas (Stebbins 2003:250). Western pond turtles spend a considerable amount of time basking on rocks, logs, emergent vegetation, mud or sand banks, or human-generated debris (Jennings et al. 1992:11). Western pond turtles move to upland areas adjacent to watercourses to deposit eggs and overwinter (Jennings and Hayes 1994:98). Turtles have been observed overwintering several hundred meters from aquatic habitat. In the southern portion of the range and along the central coast, western pond turtles are active year-round. In the remainder of their range, these turtles typically become active in March and return to overwintering sites by October or November (Jennings et al. 1992:11).

Ponds, reservoirs, Brushy Creek, and portions of other drainages in the program area may provide suitable aquatic habitat for western pond turtle. They may also deposit eggs in mixed willow riparian scrub or grassland areas near aquatic habitat in the program area. There are two CNDDB records for occurrences of western pond turtle within the program area and many additional records for occurrences within 5 miles of the program area (California Department of Fish and Wildlife 2013c).

Ponds and portions of drainages in the Golden Hills and Patterson Pass project areas may provide suitable aquatic habitat for western pond turtle. They may also deposit eggs in mixed willow riparian scrub or grassland areas near aquatic habitat in the Golden Hills and Patterson Pass project areas. There are no CNDDB records for occurrences of western pond turtle in either of the project areas (California Department of Fish and Wildlife 2013c).

Blainville's (Coast) Horned Lizard

Blainville's 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 Baja California west of the deserts and the Sierra Nevada, north to the Bay Area, and inland as far north as Shasta Reservoir. It also occurs on the Kern Plateau east of the crest of the Sierra Nevada (CaliforniaHerps.com 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). They are 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, horned lizards occupy small mammal burrows or burrow into loose soils under surface objects (Zeiner et al. 1988:48). 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, chaparral, and oak woodland in the program area provide suitable habitat for Blainville's horned lizard. There are three CNDDB records for occurrences of Blainville's horned lizard in the southeast portion of the program area, and additional records for occurrences outside of the program area (California Department of Fish and Wildlife 2013c).

Portions of grassland in the Golden Hills and Patterson Pass project areas may provide suitable habitat for Blainville's horned lizard, but there are no CNDDB records for occurrences of Blainville's horned lizard in either of the project areas (California Department of Fish and Wildlife 2013c).

Alameda Whipsnake

Alameda whipsnake is state and federally listed as threatened. The Alameda whipsnake is a subspecies of the California whipsnake. The North American distribution for the California whipsnake includes Northern California west of the Sierran Crest and desert to central Baja California. This species is found primarily in the foothills but its range extends into deciduous and pine forests of mountains. (Stebbins 2003:353–354.) Historically, Alameda whipsnake probably occurred within the entire coastal scrub and oak woodland communities throughout the East Bay in Contra Costa, Alameda, and parts of San Joaquin and Santa Clara Counties. Currently, its distribution encompasses five separate populations with little or no interchange within these same counties (70 FR 60608–60656, October 18, 2005).

Alameda whipsnakes are primarily found within a mixture of habitat types containing scrub/shrub communities, with a significant portion of annual grassland, and other wooded habitats such as blue oak-foothill pine, blue oak woodland, coastal oak woodland, valley oak woodland, riparian communities, or rock outcrops. They will also move into adjacent grassland, oak savannah, and occasionally, oak-bay woodland habitats. Alameda whipsnakes prefer habitats with woody debris and exposed rock outcrops, which provide basking areas, shelter from predators, and an abundance of western fence lizards, which are a major prey item of this snake. The subspecies has been observed to regularly move 200 meters (656 feet) from scrub and chaparral and will remain in grasslands for several hours to weeks at a time. Grasslands are used extensively during the breeding season (March through July). Male snakes use grassland areas extensively during the mating season and female snakes use grasslands after mating, possibly to search for egg-laying sites. (70 FR 60610, October 18, 2005.)

Annual grassland, scrub, chaparral, oak woodland, and mixed willow riparian scrub in the program area provide suitable habitat for Alameda whipsnake. There are seven CNDDB records for occurrences of Alameda whipsnake along the eastern portion of the program area and numerous additional records for occurrences outside but near the program area (California Department of Fish and Wildlife 2013c). Designated critical habitat for Alameda whipsnake is located in the southeast portion of the program area (Figure 3-4-4).

Annual grassland and mixed willow riparian scrub in the Golden Hills and Patterson Pass project areas may provide suitable habitat for Alameda whipsnake. There are no CNDDB records for occurrences of Alameda whipsnake in either of the project areas; however there are several records for occurrences just southeast of the project areas (California Department of Fish and Wildlife 2013c). An ICF biologist conducted habitat assessments for special-status species in the Patterson Pass project area and determined that Alameda whipsnake has a low potential to occur there because of the distance to scrub and chaparral habitats, which are the primary habitats for the species. There is no designated critical habitat for Alameda whipsnake in the Golden Hills or Patterson Pass project areas (Figure 3.4-4).

San Joaquin Coachwhip

The San Joaquin coachwhip (whipsnake) is one of six subspecies of the coachwhip that has a known range extending from Colusa County in the Sacramento Valley, south to the Grapevine in 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, coachwhip 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 28^0C 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 (10–11 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 program area provides suitable habitat for San Joaquin coachwhip. There is one CNDDB record for an occurrence of San Joaquin coachwhip along the eastern portion of the program area and two records for occurrences east and west of the program area (California Department of Fish and Wildlife 2013c).

Annual grassland in the Golden Hills and Patterson Pass project areas provides suitable habitat for San Joaquin coachwhip. There are no CNDDB occurrences of San Joaquin coachwhip in either of the project areas (California Department of Fish and Wildlife 2013c).

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, wetland, 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. White-tailed kites forage in undisturbed, open grassland, meadows, farmland, and emergent wetlands (Zeiner et al. 1990a:120).

Foraging habitat and a small amount of suitable nesting habitat for white-tailed kites are present in the program area. The CNDDB lists two records of white-tailed kite nests in the northeast and southeast portions of the program area (California Department of Fish and Wildlife 2013c) and Two additional records within 2 miles southwest of the program area.

Suitable nesting and foraging habitat for white-tailed kite is present in the Golden Hills and Patterson Pass project areas. There are no CNDDB occurrences of white-tailed kite nests in either project area (California Department of Fish and Wildlife 2013c). White-tailed kites have been documented foraging in both project areas during 2005–2011 avian use surveys conducted by the AFMT (Alameda County unpublished data).

Bald Eagle

Bald eagle is state-listed as endangered and is protected under 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). Bald eagles breed 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 and foraging habitat (Bethany Reservoir) for bald eagle is present in the program area. There are no CNDDB records for occurrences of bald eagle nests or wintering bald eagles in or near the program area (California Department of Fish and Wildlife 2013c), although the AFMT has documented them flying through the program area with increasing frequency.

Suitable nesting and foraging habitat for bald eagle may be present in the Golden Hills project area near Bethany Reservoir. No suitable nesting or foraging habitat is present in the Patterson Pass project area, but bald eagles may forage in or fly through this area. There are no CNDDB records for occurrences of bald eagle nests or wintering bald eagles in either project area (California Department of Fish and Wildlife 2013c). The AFMT has detected bald eagles four times in the vicinity of the Golden Hills project area within the last 4 years, but not in the Patterson Pass project area.

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, through the destruction of wetland habitat, native grassland, and moist meadows and through 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 program area. There are no CNDDB records of northern harrier nests within the program area; there is one record for a nest within 2 miles northeast of the program area (California Department of Fish and Wildlife 2013c). The AFMT has documented northern harriers foraging in all months of the year throughout the program area.

Suitable nesting habitat may be present and suitable foraging habitat is present for northern harrier in the Golden Hills and Patterson Pass project areas. Although there are no CNDDB records of northern harrier nests in either project area (California Department of Fish and Wildlife 2013c), the AFMT has documented northern harriers year-round in the APWRA as noted above.

Swainson's Hawk

Swainson's hawk is a state-listed threatened species and a species of local conservation concern. 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%) 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).

Although suitable nesting and foraging habitat for Swainson's hawks is present in the program area, Swainson's hawks more typically occur in flat terrain and rarely occur in the foothills of the Coast Ranges. There is one CNDDB record of a Swainson's hawk nest in the northeastern portion of the program area (California Department of Fish and Wildlife 2013c), and East Bay Regional Park District (EBRPD) reported a Swainson's hawk nesting in the program area (Barton pers. comm.). There are 11 additional CNDDB records of Swainson's hawk nests east and northeast of the program area, including one that is just outside of the program area. Swainson's hawk has been documented as a fatality only once in more than 7 years of intensive fatality monitoring (ICF International 2013), and only 11 sightings of Swainson's hawks have been recorded in the program area in more than 7 years of avian use monitoring conducted throughout the program area by the AFMT (Alameda County unpublished data).

Foraging habitat and a small amount of suitable nesting habitat for Swainson's hawks is present in the Golden Hills and Patterson Pass project areas. There are no CNDDB records of Swainson's hawk nests in either project area (California Department of Fish and Wildlife 2013c), and, as noted above, the AFMT has rarely observed Swainson's hawks in the APWRA.

Red-Tailed Hawk

Red-tailed hawk is not a state- or federally listed species. However, it is protected under the MBTA and the California Fish and Game Code and is an APWRA focal species. Red-tailed hawks occur in California throughout the year. Large numbers of migratory and wintering red-tailed hawks enter the Central Valley from October through February, substantially augmenting the population occurring within the state. Migratory, wintering, and resident red-tailed hawks inhabit California in open areas, such as grasslands, agricultural fields, pastures, and open brush habitats, that are interspersed with patches of trees or structurally similar features for nesting, perching, and roosting (Polite and Pratt 1990). This species is primarily a sit-and-wait predator that requires elevated perch sites for hunting; however, red-tailed hawks can also be seen soaring over open landscapes and swooping for prey. Their diet includes a wide variety of small to medium-sized mammals, birds, and snakes, with occasional insects and fresh carrion (Preston and Beane 1993). Nest locations vary with vegetation and topography.[1] In the western United States, satellite tracking indicates that adult red-tailed hawks show high fidelity to their summer and winter ranges and to migration routes (Goodrich and Smith 2008).

While the CNDDB does not contain records for red-tailed hawks, previous studies found the program area and the surrounding region to be an important winter foraging area and migration corridor for raptors, including red-tailed hawks (California Department of Fish and Game 1993).

[1] Observations of nesting red-tailed hawks in the APWRA in 2005 to 2006 were confirmed in the field by Jones & Stokes wildlife biologist Julia Camp.

Natural perches from which this species hunts were scarce before development of the APWRA. Turbines and transmission towers, poles, and lines provide abundant perches and may have resulted in a substantial increase in wintering red-tailed hawks in the program area over historic numbers (Orloff and Flannery 1992).

Golden Eagle

Golden eagle is fully protected under the California Fish and Game Code and is an APWRA focal species. It is also protected by the MBTA, the BGEPA, and several sections of the California Fish and Game Code.

Golden eagle is a year-round resident throughout much of California. The species does not breed in the center of the Central Valley but breeds in much of the rest of the state. Golden eagles typically occur in rolling foothills, mountain areas, sage-juniper flats, and deserts (Zeiner et al. 1990a:142–143). In California, golden eagles nest primarily in open grasslands and oak (*Quercus* spp.) savanna but will also nest in oak woodland and open shrublands. Golden eagles forage in open grassland habitats (Kochert et al. 2002:6). Preferred territory sites include those that have a favorable nest site, a dependable food supply (small to medium mammals, including ground squirrels, 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 1990:262). In the interior central Coast Ranges of California, golden eagles favor open grasslands and oak savanna, with lesser numbers in oak woodland and open shrublands. In the Diablo Range of California, all except a few pairs nest in trees in oak woodland and oak savanna habitats due to a lack of suitable rock outcrops or cliffs. Nest tree species include several oak species (*Quercus* spp.), foothill pine (*Pinus sabianiana* and *P. coulteri*), California bay laurel (*Umbellularia californica*), eucalyptus (*Eucalyptus* spp.), and western sycamore (*Platanus racemosa*). A few pairs of eagles nest on electrical transmission towers traversing grasslands (Hunt et al. 1999:13).

Suitable nesting and foraging habitat for golden eagle is present in the program area. The APWRA has been reported to contain a higher density of golden eagles than anywhere else in the world (Hunt and Hunt 2006). The Predatory Bird Research Group estimated that at least 70 active golden eagle territories existed within 19 miles of the program area, based on annual surveys from January 1994 to December 1997 (Hunt et al. 1999). These territories were resurveyed and occupancy verified in 2005 (Hunt and Hunt 2006). The golden eagle population within 19 miles of the APWRA includes seven golden eagle territories/breeding areas within the Los Vaqueros watershed. Nest surveys and monitoring have been conducted within the watershed from 1994 to 2013, and 26 golden eagle nest structures have been documented during this period. Six of the seven breeding areas were occupied by golden eagle pairs during 2013 (California Environmental Services 2014). Moreover, EBRPD reported three historic and one recent golden eagle nests within the program area and two additional nests within 2 miles of the program area (Barton pers. comm.). There are no CNDDB records of golden eagle nests within the program area; however, there are 10 records of nests within 3.5 miles north and northwest of the program area (California Department of Fish and Wildlife 2013c). In early 2014, ground-based surveys for golden eagles were initiated in an expanded area to collect information on site occupancy and nesting success of the broader population of golden eagles in the Diablo Mountains. This study is a collaborative effort led by the U.S. Geological Survey, with the overall objective being to develop and evaluate survey and monitoring methods for estimating trends in occurrence and nesting success of golden eagles (U.S. Geological Survey 2013). The results of the 2014 surveys have not yet been published.

Golden eagle is unlikely to nest at Patterson Pass because the larger willow trees present are located in a deep ravine and do not offer an open view of the landscape. Suitable nesting habitat for golden eagle may be present in the Golden Hills project area, and golden eagles may forage in either project area. The CNDDB lists no occurrences of golden eagle nests in either project area (California Department of Fish and Wildlife 2013c).

Research of the golden eagle population in the APWRA has revealed it to be stable but with reduced resilience due to turbine-related mortality. Hunt (2002) examined data collected over a 7-year period between 1994 and 2002 that included the monitoring of 60–70 active territories within 30 kilometers (19 miles) of the APWRA. In 2005, these territories were found still to be 100% occupied (Hunt and Hunt 2006). The conclusions of these studies were that the golden eagle population in the APWRA region remains stable (Hunt 2002; Hunt and Hunt 2006). In addition, the studies found no increase in the number of actively breeding subadults, indicating that there are enough floaters to buffer any loss of breeding adults (Hunt 2002; Hunt and Hunt 2006). The conclusion of a stable golden eagle population in the APWRA vicinity was supported by the results of a population dynamics model that used reproduction rates and fatality rates, among other variables (Hunt 2002). However, the model results also suggested that the number of estimated annual fatalities used in the model, 50 individuals, could not be sustained by the number of breeding adults when considering the loss of reproductive potential incurred by each eagle fatality (Hunt and Hunt 2006). Although the vacant territories are filled by floaters and subadults to stabilize the APWRA population, the APWRA vicinity can be considered a population sink because the population demands a flow of recruits from outside the area to fill breeding vacancies as they occur.

Hunt and Hunt (2006) recommended future studies of the APWRA golden eagle populations to better understand long-term trends. The U.S. Geological Survey is currently conducting a population inventory in the APWRA region (U.S. Geological Survey 2013) to build on previous research by expanding surveys of territory occupancy and nesting success to include the broader population of golden eagles in the Diablo Mountains. The objectives of the study are to (1) estimate the breeding and nonbreeding population and measure reproductive success, (2) evaluate golden eagle detectability based on temporal and survey methodology factors, and (3) recommend strategies for improving golden nesting success and methods to monitor trends (U.S. Geological Survey 2013). This study will help to inform future management of golden eagles in the APWRA and surrounding region.

American Kestrel

American kestrel is not a state- or federally listed species. However, it is protected under the MBTA and the California Fish and Game Code and is an APWRA focal species. The North American Breeding Bird Survey has detected significant declines of American kestrel populations in many areas of the United States, including California (Smallwood and Bird 2002).

American kestrels are found in a variety of open to semi-open habitats, including meadows, grasslands, deserts, early field successional communities, open parkland, agricultural fields, and both urban and suburban areas (Smallwood and Bird 2002). Grinnell and Wythe (1927) described American kestrel as a common resident throughout the San Francisco Bay region. American kestrels are cavity nesters, using tress, snags, rock crevices, cliffs, banks, and buildings (Polite and Ahlborn 1990). They display strong site fidelity to breeding territories and wintering areas; however, little information exists regarding the actual delineation of territory size. The breeding season in

California occurs between late February and August, with egg laying occurring from mid-March to late June (Smallwood and Bird 2002).

American kestrels forage on a wide variety of insects, including grasshoppers, cicadas, beetles, dragonflies, butterflies, and moths; small rodents, especially voles and mice; and small birds (Sherrod 1978). American kestrels are perch and pounce or hover and pounce predators, rarely pursuing prey on wing (Polite and Ahlborn 1990); they tend to perch lower as wind speed increases (Smallwood and Bird 2002).

While the CNDDB does not contain records for American kestrel, previous studies in the region have found the program area vicinity to be an important winter foraging area and migration corridor for raptors, including American kestrels (California Department of Fish and Game 1993). Natural perches from which this species hunts were scarce before development of the APWRA. Turbines and transmission towers, poles, and lines provide abundant perches and have likely resulted in a substantial increase in American kestrel numbers in the APWRA over historic numbers (Orloff and Flannery 1992).

Prairie Falcon

Prairie falcon is not a state- or federally listed species. However, it is protected under the MBTA and the California Fish and Game Code and is a species of local conservation concern in the APWRA due to the high number of recorded fatalities. Prairie falcon inhabits arid environments of western North America in open plains and shrub-steppe deserts with cliffs, bluffs, or rock outcroppings. An efficient and specialized predator of medium-sized desert mammals and birds, prairie falcons range widely, searching large areas for patchily distributed prey. Nesting, postnesting, and wintering ranges are generally widely separated, with movements between ranges being potentially dependent on seasonal availability of prey. These diurnal hunters prey predominantly on ground squirrels, small birds, reptiles, and insects. Hunting strategies include still-hunting from perches, soaring, and low active flight (Phipps 1979). Prairie falcons nest on cliffs with eagles, ravens, and red-tailed hawks, but have also been known to use trees, caves, buildings, and transmission lines (Nelson 1974; Pitcher 1977; Haak and Denton 1979; MacLaren et al. 1984; Roppe et al. 1989; Bunnell et al. 1997).

The CNDDB (2013c) lists two prairie falcon occurrences within the program area, and 11 more within 10 miles of the program area boundary. Twenty-six observations of prairie falcons were recorded during fixed point surveys around the Diablo Winds repowering project from 2005 to 2007 (Western Ecosystems Technology 2008). At least four recent known nest sites have been identified within the APWRA and at least two within 2 miles of the program area. A telemetry study conducted by East Bay Regional Parks District (unpublished data) has documented extensive use of the program area by prairie falcons nesting more than 10 miles from the program area (Final PEIR Appendix E, Comment LA-1-46).

Barn Owl

Barn owl is not a state- or federally listed species. However, it is on the DFG Watch List, is protected under the MBTA and the California Fish and Game Code, and is a species of local conservation concern in the APWRA. Barn owl is found throughout most of the United States, except in the northern portions of the Rockies, midwest, and northeast (Marti et al. 2005). Within California, this species is a year-round resident ranging from sea level to 5,500 feet, preferring habitat in grasslands, agricultural fields, chaparral, and marshes and other wetland areas. Barn owls nest in a wide variety of cavities, natural and artificial, such as trees, cliffs, caves, riverbanks, church steeples, barn lofts, haystacks, and nest boxes. The species' breeding numbers seem limited by the availability of nest cavities near adequate densities of prey. Most hunting occurs while flying about 5–15 feet above the ground in open habitats, using excellent low-light vision and sound to detect prey (Marti 1974; Bunn et al. 1982). Barn owls occasionally hunt from perches and feed primarily on mice, rats, voles, pocket gophers, and ground squirrels. They also consume shrews, insects, crustaceans, reptiles, amphibians, and birds, including meadowlarks and blackbirds (Polite 1990).

The barn owl breeding season in California occurs between January and November, with egg laying potentially occurring during most months, as barn owls typically have two broods a year (Polite 1990; Marti et al. 2005). Reproductive success varies with age, prior breeding experience, prey availability, and weather (Marti et al. 2005). Barn owls defend only the immediate vicinity of the nest, allowing two or more pairs to nest in close proximity and share the same foraging habitat.

There is no significant continent-wide barn owl population trend. Population declines have been evident in the Midwest and Northeast, while western U.S. populations appear to be mostly stable. Local threats or declines do not pose a major conservation problem from a global perspective (NatureServe 2012). The CNDDB does not contain records for barn owls as they are not a state- or federally listed species. Studies of wind-turbine-related fatalities in the APWRA have found numerous barn owls, suggesting this species is fairly common in portions of the program area. Barn owls are particularly common in the areas of Brushy Peak and Vasco Caves Regional Preserves, using available rock outcrops, palm trees, and structures for nesting and roosting (East Bay Regional Parks District 2000).

Western Burrowing Owl

Western burrowing owl is a California species of special concern and an APWRA focal species. Western burrowing owl is a year-round resident in the Central Valley, San Francisco Bay region, Carrizo Plain, and Imperial Valley. They occur 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 amounts of 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).

Suitable nesting and foraging habitat for western burrowing owl is present in the program area. There are 30 records for occurrences of breeding and/or wintering owls in the program area (California Department of Fish and Wildlife 2013c). The majority of these records are in the northern portion of the program area. There are more than 40 additional CNDDB records for occurrences of burrowing owl surrounding the program area. Moreover, western burrowing owl fatalities have been documented during APWRA fatality surveys (ICF International 2013). A recent study conducted under the auspices of the AFMT produced an estimate of the APWRA-wide breeding season population of burrowing owls of approximately 635 pairs (90% confidence interval 368–903, P228) (Smallwood et al. 2011).

Suitable nesting and foraging habitat for western burrowing owl is present in the Golden Hills and Patterson Pass project areas. There are two CNDDB records of occurrences of burrowing owl in the

Patterson Pass project area and one CNDDB record for burrowing owl in the Golden Hills project area (California Department of Fish and Wildlife 2013c). Burrowing owls have been documented in both the Golden Hills and Patterson Pass project areas during avian use surveys conducted by the AFMT (Alameda County unpublished data).

Loggerhead Shrike

Loggerhead shrike is a California species of special concern and a species of local conservation concern in the APWRA. In California, the range of loggerhead shrike extends throughout most of the state except for the heavily forested areas of the coastal slope, Coast Ranges, Klamath and Siskiyou mountains, Sierra Nevada and southern Cascades, and high elevations of the Transverse Ranges. Loggerhead shrikes breed in shrublands and open woodlands with grass cover and bare ground. They search for prey from tall shrubs, trees, fences, and power lines, and frequently impale their prey on sharp, thorny, or multi-stemmed plants and barbed-wire fences. Loggerhead shrikes forage in open areas with short grasses and forbs or bare ground. (Shuford and Gardali 2008: 274) Nests are built in trees or shrubs with dense foliage and are usually hidden well. The nesting period for loggerhead shrikes is March through June (Zeiner et al. 1990a:546).

Suitable nesting and foraging habitat for loggerhead shrike is present in the program area. There are three CNDDB records for occurrences of loggerhead shrike nests in the southeast portion of the program area. There are four additional CNDDB records for occurrences east, southeast, and southwest of the program area (California Department of Fish and Wildlife 2013c). Loggerhead shrike fatalities have been documented during APWRA fatality surveys (ICF International 2013), and loggerhead shrikes are regularly documented in the program area during avian use surveys conducted by the AFMT (Alameda County unpublished data).

Suitable foraging habitat for loggerhead shrike is present in the Golden Hills and Patterson Pass project areas, and suitable breeding habitat may be present. Although there are no CNDDB records of loggerhead shrike nests in either of the project areas (California Department of Fish and Wildlife 2013c), loggerhead shrikes are regularly documented in portions of both project areas during avian use surveys conducted by the AFMT (Alameda County unpublished data).

Tricolored Blackbird

Tricolored blackbird is a California species of special concern. Tricolored blackbird is a highly colonial species that is largely endemic to California. Tricolored blackbird breeding colony sites require open, accessible water; a protected nesting substrate, including either flooded, thorny, or spiny vegetation; and a suitable foraging space providing adequate insect prey within a few miles of the nesting colony. Tricolored blackbird breeding colonies occur in freshwater marshes dominated by tules and cattails, in Himalayan blackberries (*Rubus armeniacus*), and in silage and grain fields (Beedy and Hamilton 1997:3–4). The breeding season is from late February to early August (Beedy and Hamilton 1999). Tricolored blackbird foraging habitats in all seasons include annual grasslands, dry seasonal pools, agricultural fields (such as large tracts of alfalfa with continuous mowing schedules, and recently tilled fields), cattle feedlots, and dairies. Tricolored blackbirds also forage occasionally in riparian scrub habitats and along marsh borders. Weed-free row crops and intensively managed vineyards and orchards do not serve as regular foraging sites. Most tricolored blackbirds forage within 3 miles of their colony sites but commute distances of up to 8 miles have been reported (Beedy and Hamilton 1997:5).

Surveys during the 1990s (Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000) confirmed a significant declining trend in California populations since the 1930s, with a particularly dramatic decline noted after 1994. Statewide surveys conducted during the 2000s indicate some recovery from the 1999 low; however, the population increases have primarily been limited to the San Joaquin Valley and the Tulare Basin (Kyle and Kelsey 2011). A total of 145,135 tricolored blackbirds were counted during the most recent (2014) statewide survey, with Madera, Placer, Sacramento, and Tulare Counties accounting for about 64% of the total population in April 2014 (Meese 2014:6,8). The number of tricolored blackbirds statewide decreased from approximately 395,000 in 2008 to 259,000 in 2011, a decline of 34% Breeding surveys conducted between 1994 and 2011 documented tricolored blackbird populations that fluctuated from just under 100,000 birds to nearly 400,000 birds (Kyle and Kelsey 2011). From 2011 to 2014, the number of tricolored blackbirds declined by 44%, from approximately 259,000 to 145,000. The decline in tricolored blackbirds from 2008 to 2014 was 64%. While the number of tricolored blackbirds is down statewide, declines are most pronounced in the San Joaquin Valley (78% decline between 2008 and 2014) and along the Central Coast (91% decline between 2008 and 2014). Conversely, populations in Sacramento County and the Sierra Nevada Foothills have increased by 145% since 2008. Overall, the rate of decline appears to be accelerating, and additional efforts to reduce the rate of decline may be necessary (Meese 2014:6–7, 13–15).

Suitable nesting and foraging habitat for tricolored blackbird is present in the program area. There are two CNDDB records of tricolored blackbird nesting colonies in the program area. These nesting colonies are located in the north-central portion of the program area and just southeast of Bethany Reservoir. There is one additional record for a tricolored blackbird colony approximately 1.5 miles east of the program area (California Department of Fish and Wildlife 2013c). Tricolored blackbird has also been documented during APWRA fatality surveys (ICF International 2013).

Suitable foraging habitat for tricolored blackbird is present in the Golden Hills and Patterson Pass project areas, and suitable breeding habitat may be present. There are no CNDDB records of tricolored blackbird nesting colonies in either of the project areas; however, there is one record for a nesting colony near Bethany Reservoir just outside the Golden Hills project area (California Department of Fish and Wildlife 2013c).

Little Brown Bat

Little brown bat is considered a moderate priority species in California by the Western Bat Working Group (2007). The species occurs primarily in mid- to upper elevations in California. It is associated with woodland habitats in both urban and wilderness areas but may occur anywhere in California during seasonal movements. Little brown bats forage over water and along woodland edges. They use a wide variety of crevice and cavity-type roost sites in trees, buildings, other artificial structures, and rock formations and caves, and rely on night roosts between foraging bouts (Anthony et al. 1981:151). Maternity colonies can contain several hundred bats. The species congregates in mating swarms in the fall, though mating continues in hibernacula throughout the winter. Little brown bats hibernate in caves and abandoned mines, potentially in large aggregations.

Suitable foraging habitat for little brown bat is present along drainages and over ponds and other aquatic habitats in the program area. Small amounts of suitable roosting habitat may be present in the program area as well. There are no CNDDB records of little brown bat roosts in the program area (California Department of Fish and Wildlife 2013c); however, a single little brown bat fatality has been tentatively identified in the program area during APWRA fatality surveys (ICF International 2013).

A small amount of suitable roosting habitat may be present in the golden Hills and Patterson Pass project areas. However, given the currently known elevation preferences and range for this species in California, it is unlikely that any location in the APWRA contains hibernacula or significant maternity roosting habitat. There are no CNDDB records of little brown bat roosts in either project area (California Department of Fish and Wildlife 2013c); nevertheless, little brown bats may forage in or fly through both project areas.

Silver-Haired Bat

Silver-haired bat is considered a moderate priority species in California by the Western Bat Working Group (2007). Silver-haired bats occur primarily in the northern portion of California and at higher elevations in the southern and coastal mountain ranges (Brown and Pierson 1996) but may occur anywhere in California during their spring and fall migrations. They are associated with coastal and montane coniferous forests, valley foothill woodlands, pinyon-juniper woodlands, and valley foothill and montane riparian habitats (Zeiner et al. 1990b:54). Silver-haired bats roost in trees almost exclusively in the summer, and maternity roosts typically are located in woodpecker hollows or in gaps under bark. Maternal colonies range from several to about 75 individuals (Brown and Pierson 1996).

Suitable foraging habitat for silver-haired bat is present along drainages and over ponds and other aquatic habitats in the program area. Trees in the program area may provide suitable roosting habitat for silver-haired bat. There are no CNDDB records of silver-haired bat roosts in the program area (California Department of Fish and Wildlife 2013c).

Suitable foraging habitat for silver-haired bat is present along drainages and over ponds in the Golden Hills and Patterson Pass project areas. Trees in the project areas may provide suitable roosting habitat for silver-haired bat. There are no CNDDB records of silver-haired bat roosts in either project area (California Department of Fish and Wildlife 2013c).

Western Red Bat

Western red bat is a California species of special concern and is considered a high priority species in California by the Western Bat Working Group (2007). It occurs throughout much of California at lower elevations. It is found primarily in riparian and wooded habitats but also occurs seasonally in urban areas (Brown and Pierson 1996). Western red bats roost in the foliage of trees that are often located on the edge of habitats adjacent to streams, fields, or urban areas. This species breeds in August and September and young are born in May through July (Zeiner et al. 1990b:60).

Suitable foraging habitat for western red bat is present along drainages and over ponds and other aquatic habitats in the program area. Trees and mixed willow riparian scrub in the program area may provide suitable roosting habitat for western red bat. There are no CNDDB records of western red bat roosts in the program area (California Department of Fish and Wildlife 2013c); however, western red bat has been documented in the program area during APWRA fatality surveys (ICF International 2013).

Suitable foraging habitat for western red bat is present along drainages and over ponds in the Golden Hills and Patterson Pass project areas. Trees and mixed willow riparian scrub in the project areas may provide suitable roosting habitat for western red bat. There are no CNDDB records of western red bat roosts in either project area (California Department of Fish and Wildlife 2013c).

Hoary Bat

Hoary bat is considered a moderate priority species in California by the Western Bat Working Group (2007). Hoary bats occur throughout California but are thought to have a patchy distribution in the southeastern deserts (Zeiner et al. 1990b:62). Hoary bats are found primarily in forested habitats, including riparian forests, and may occur in park and garden settings in urban areas. Day roost sites are in the foliage of coniferous and deciduous trees (Brown and Pierson 1996). Woodlands with medium to large trees with dense foliage provide suitable maternity roost sites (Zeiner et al. 1990b:62). Mating occurs in the fall, and after delayed fertilization, young are born May–June (Zeiner et al. 1990b:62; Brown and Pierson 1996).

Suitable foraging habitat for hoary bats is present along drainages and over ponds and other aquatic habitats in the program area. Trees and mixed willow riparian scrub in the program area may provide suitable roosting habitat for hoary bat. There are no CNDDB records of hoary bat roosts in the program area; however, there is one historic record of a roost near Lake del Valle, southwest of the program area (California Department of Fish and Wildlife 2013c). In addition, hoary bat has been documented in the program area during APWRA fatality surveys (ICF International 2013) and in acoustic surveys at the Vasco Wind repowering site (Pandion Systems 2010; Szewczak 2013).

Suitable foraging and potentially suitable roosting habitat for hoary bats is present in the Golden Hills and Patterson Pass project areas. Trees and mixed willow riparian scrub in the project areas may provide suitable roosting habitat for hoary bat. There are no CNDDB records of hoary bat roosts in either project area (California Department of Fish and Wildlife 2013c).

Townsend’s Big-Eared Bat

Townsend’s big-eared bat is a candidate species for listing under the California Endangered Species Act, is a California state species of special concern, and a high priority species under the Western Bat Working Group’s conservation priority matrix (Western Bat Working Group 2007). Townsend’s big-eared bat occurs throughout California but distribution appears to be limited by the availability of cavern-like roost structures. Townsend’s big-eared bats have been found in a wide variety of habitats from desert to riparian and coastal woodland, but they are found in greatest numbers in areas with cavern-forming rock or abandoned mines (Western Bat Working Group 2005). Townsend’s big-eared bats roost in dome-like spaces in caves or mines, where they roost hanging in the open from the ceiling. They have also been known to use cavern-like spaces in abandoned buildings or bridges, and in the basal hollows in large coast redwood trees (Mazurek 2004:60). Mating occurs in fall and spring, and pups are born in late spring to early summer (Pierson and Rainey 1998:2). Maternity roost size varies, and may contain only a few or up to several hundred individuals. The species is believed to be relatively sedentary, hibernating in caves and mines near summer maternity roosts, though seasonal movements are not well understood. Townsend’s big-eared bats may have hibernated historically in aggregations of thousands of individuals (Pierson and Rainey 1998:1). They are highly sensitive to roost disturbance.

Suitable foraging habitat for Townsend’s big-eared bat is present along drainages and over ponds and other aquatic habitats in the program area. Small amounts of suitable roosting habitat may be present in the program area as well. There are no CNDDB records of Townsend’s big-eared bat roosts in the program area; however there is one record of a roost site southwest of the program area near Lake del Valle (California Department of Fish and Wildlife 2013c).

It is unlikely that suitable roosting habitat for Townsend's big-eared bat is present in the Golden Hills and Patterson Pass project areas; however, Townsend's big-eared bats may forage in or fly through both of these project areas. There are no CNDDB records of Townsend's big eared bat roosts in either project area (California Department of Fish and Wildlife 2013c).

Pallid Bat

Pallid bat is a California species of special concern and is considered a high priority species in California by the Western Bat Working Group (2007). It is found throughout most of California at low to middle elevations (6,000 feet). Pallid bats are found in a variety of habitats including desert, brushy terrain, coniferous forest, and non-coniferous woodlands. Daytime roost sites include rock outcrops, mines, caves, hollow trees, buildings, and bridges. Night roosts are commonly under bridges but are also in caves and mines (Brown and Pierson 1996). Hibernation may occur during late November through March. Pallid bats breed from late October through February (Zeiner et al. 1990b:70) and one or two young are born in May or June (Brown and Pierson 1996).

Suitable foraging habitat for pallid bat is present along drainages and over ponds and other aquatic habitats in the program area. Small amounts of suitable roosting habitat may be present in the program area as well. There are no CNDDB records of pallid bat roosts in the program area; however there are two records for occurrences southwest of the program area (California Department of Fish and Wildlife 2013c).

Suitable foraging habitat for pallid bat is present along drainages and over ponds in the Golden Hills and Patterson Pass project areas. Trees in the project areas may provide suitable roosting habitat for pallid bat. There are no CNDDB records of pallid bat roosts in either project area (California Department of Fish and Wildlife 2013c).

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 in the program area. There are eight records for occurrences of badgers in the program area (California Department of Fish and Wildlife 2013c). There are four additional CNDDB records for occurrences of American badger outside but near the program area.

Suitable denning and foraging habitat for American badger is present in the Golden Hills and Patterson Pass project areas. There are two CNDDB records for occurrences of American badger in the Golden Hills project area, and an additional occurrence just outside it (California Department of Fish and Wildlife 2013c). There are no CNDDB records for American badger in the Patterson Pass 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; those areas have been used 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 they 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. 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 program area. There are 11 records for occurrences of San Joaquin kit fox in the program area (California Department of Fish and Wildlife 2013c). The majority of the occurrences are in the north and eastern portions of the program area. There are 15 additional CNDDB records for occurrences of San Joaquin kit fox outside but near the program area.

Suitable denning and foraging habitat for San Joaquin kit fox is present in the Golden Hills and Patterson Pass project areas. There are three CNDDB records for occurrences of San Joaquin kit fox in the Golden Hills project area and one in the Patterson Pass project area (California Department of Fish and Wildlife 2013c).

Birds and Bats Subject to Turbine-Related Mortality

In addition to the special-status wildlife species discussed above, several non-special-status species of birds and bats are considered in this EIR because of their potential to be killed by operating wind turbines. Bats are particularly vulnerable because of their low reproductive rate and susceptibility to turbine-related mortality. Past and existing turbine-related avian and bat mortality and monitoring are discussed below to provide context for the turbine-related avian and bat mortality impact discussions.

Avian Mortality and Monitoring

The APWRA supports a broad diversity of resident, migratory, and wintering bird species that regularly move through the 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 mortality 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; ICF International 2013).

Until recently, attempts to reduce avian fatalities in the APWRA have focused primarily on two management actions: the shutdown of turbines during the winter period when use of the area by red-tailed hawks, golden eagles, and American kestrels is highest, and the removal of turbines determined to pose the highest collision risk based on history of fatalities, topographic position of the turbine, and other factors (Smallwood and Spiegel 2005a, 2005b, 2005c; ICF International 2013). While these actions have met with some success, their effectiveness has been less than expected for reasons that are not yet clear. However, an increasing body of evidence suggests that repowering—in this case the replacement of numerous older, smaller turbines with fewer newer, larger turbines—could result in a substantial reduction in avian fatalities. Using the first few years of data from the Alameda County Avian Fatality Monitoring Program, Smallwood and Karas (2009) concluded that the most effective way to reduce turbine-related avian fatalities in the APWRA is to repower. Evidence collected to date from the three sites in the APWRA that have been repowered suggests that the larger modern turbines cause substantially fewer turbine-related avian fatalities than the older generation turbines (Brown et al. 2013; ICF International 2013), although it should be pointed out that two of the three sites involved had much smaller turbines than those proposed for use in the program. The Scientific Review Committee (SRC) for the APWRA has also produced guidelines for siting wind turbines to reduce avian fatalities in the APWRA. The SRC evaluated topographic, wind pattern, bird behavior, and turbine siting variables related to hazardous conditions to provide guidance to the wind companies to reduce avian collision hazards (Alameda County Scientific Review Committee 2010).

The monitoring program established by the Settlement Agreement described in Chapter 1 of this EIR and conducted by the Alameda County AFMT has resulted in considerable information on which to base conclusions about the effects of the APWRA-wide program and the Golden Hills and Patterson Pass repowering projects. The monitoring program has been running continuously since 2005, and annual estimates of turbine-related avian fatality rates and estimates of the total number of birds killed each year are available for each bird year from 2005 through 2011. A bird year starts on October 1 and ends on September 30 and is named for the calendar year in which it starts. Bird years are used as the basis for analysis because they better reflect the timing of avian movements and ecology than do calendar years (ICF International 2013).

Bat Fatality and Monitoring

The APWRA supports habitat types suitable for maternity, foraging, and migration for special-status and common bats. Several of these species are susceptible to direct mortality through collision or other interactions with wind turbines. Five species of bat have been documented as fatalities in the APWRA: little brown bat, California myotis, western red bat, hoary bat, and Mexican free-tailed bat (Table 3.4-6) (Insignia Environmental 2012:47–48; ICF International 2013:3-3). Hoary bats and Mexican free-tailed bats have made up the majority of documented fatalities; western red bat, another migratory species and a California species of special concern, has sustained the third highest number of documented fatalities.

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 of pre- and postconstruction acoustic survey data from the recently repowered Vasco Winds facility in the Contra Costa County portion of the APWRA documents the presence of four additional species (big brown bat, silver-haired bat, canyon bat, and Yuma myotis). Acoustic surveys indicated bat activity in all three seasons in which surveys were conducted, with a spike in activity in the fall (Pandion Systems 2010; Szewczak 2013). Mexican free-tailed bat and hoary bat comprised the majority of the acoustic detections (Pandion Systems 2010).

Relatively little is known about bat biology as it relates to fatality risk at wind energy facilities. Limited knowledge of such factors as migration, mating behavior, behavior around turbines, and seasonal movements impede efforts to predict risk of turbine collision. Studies at wind energy facilities in North America generally show strong seasonal and species-composition patterns in bat fatalities, with the bulk of fatalities consisting of migratory species and occurring in late summer to mid-autumn. 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.

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, due at least in part to the monitoring program's design, which has focused on bird mortality. As previous study methods were not designed to generate defensible bat mortality rates, and as new generation turbines may pose novel threats to bats, assumptions of species vulnerability based on extrapolation from the older turbine technologies present in the APWRA are not necessarily valid (California Bat Working Group 2006).

Calculating adjusted bat fatality rates at old generation turbines using data collected under the early avian monitoring program is problematic both because the sample size is low and because monitoring and analysis methods were not designed to detect and adjust for these types of fatalities. In their paper grappling with comparisons of fatality rates between old-generation turbines at the APWRA and early repowering projects, Smallwood and Karas (2009) illustrated these points by acknowledging that all of their old-generation bat fatality estimates are likely biased low (2009:1065) and that differences observed in comparisons of various bat fatality estimates, even those as seemingly significant as 800%, could not be statistically defended due to the small sample sizes involved (Smallwood and Karas 2009:1066–67).

Bat fatality rates available for old-generation turbines at the APWRA are as follows. For the earlier years, covering 1998–2002 and a combination of turbine models, nameplate capacities, and designs, Smallwood and Karas presented a bat fatality rate estimate of 0.115 (SE+- 0.073) bat deaths/MW/year (2009:1066). For more recent old-generation turbine monitoring years (2005–2007), Smallwood and Karas presented a bat fatality rate estimate of 0.263 (SE+_0.172) bat deaths/MW/ year, (used as the baseline in this PEIR) (2009:1066).

Bat fatality rates documented at the three repowered projects in the APWRA vary. These rates were also generated using different search efforts and different adjustment calculations, making direct comparison problematic, despite the common metric reported. For the Diablo Winds Energy Project (2005–2007), Smallwood and Karas (2009:1067) reported a bat fatality rate estimate of 0.783 (SE+- 0.548)/MW/year; for the Buena Vista Wind Farm (2008-2010), Insignia Environmental (2012:ES-3) reported a bat fatality rate range of 0.48–1.08/MW/year, depending on calculation methods; for the first year of the Vasco Winds repowering project (2012–2013), Brown et al. (2013:35–36) reported a bat fatality rate range of 0.663 (SE+- 0.486) to 2.281 (SE+- 1.06)/MW/year, with the "best estimate" rate reported as 1.679 (SE+- 0.801)/MW/year (2013:39).

Consistent across all documented rates, though methods used to generate these rates vary, is that reported bat fatality rates increased when old-generation turbines were replaced by newer, larger turbines (Smallwood and Karas 2009:1068). Turbines used in future repowering projects are likely to be similar in size to the Vasco Winds turbines but much larger than the Diablo Winds and Buena Vista turbines in both overall size and rated nameplate capacity. In a meta-analysis of bat fatalities at numerous wind energy facilities in North America, Barclay et al. found that bat fatality increased exponentially with increasing turbine height (2007:384).

The limited data available for the program area and vicinity suggest the potential for similar species composition and temporal patterns of bat mortality to those that have been documented at the Vasco Winds repowering project and at other fourth-generation wind energy facilities, such as those in the Montezuma Hills Wind Resource Area.

Table 3.4-6. Raw Bat Fatalities by Species Detected in Standardized Searches at Various APWRA Monitoring Projects

Species	2005	2006	2007	2008	2009	2010	Total
APWRA Monitoring[a]							
Hoary bat	0	2	1	0	2	0	5
Mexican free-tailed bat	0	1	1	1	1	0	4
Western red bat	0	1	1	1	0	0	3
Little brown bat	0	0	0	0	1	1	2
Unidentified bat	0	2	1	1	1	2	7
Total bats	0	6	4	3	5	3	21
Buena Vista Repowering Project[b]							
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
Vasco Winds Repowering Project, Year One[c]							
Hoary bat							10
Mexican free-tailed bat							7
Western red bat							1
Unidentified bat							1
Total bats							19

Sources: APWRA: ICF International 2013:3-3; Buena Vista: Insignia Environmental 2012:47-8.
Note: Fatalities are shown for all years for which monitoring data are available.
[a] Variable: up to 417 MW installed, turbine heights of 60–164 feet.
[b] 38 MW installed, turbine heights of 147–196 feet. Monitoring results from February 2008 to January 2011.
[c] 78 MW installed, turbine heights of 263 feet. Monitoring results from May 2012–May 2013.

3.4.2 Environmental Impacts

Methods for Analysis

This section describes the methods and assumptions used to determine the direct and indirect impacts of the program and the two specific projects on biological resources. The general methods for analysis are followed by discussions of the methods used to evaluate and quantify avian and bat fatality impacts. The methods for analysis of impacts on biological resources are based on professional standards and information cited throughout this section. The key effects were identified and evaluated based on the environmental characteristics of the program and project areas and the expected magnitude, intensity, and duration of activities related to the construction and operation of the program and the Patterson Pass and Golden Hills projects.

Direct impacts are those effects that are directly caused by project construction and operation (even if the resulting effect becomes apparent over time). Indirect impacts are those effects of a project that occur either later in time or at a distance from the project location but are reasonably foreseeable, such as conversion of wetlands to uplands from diversion of upstream water sources. Direct and indirect impacts can be either permanent or temporary. Impacts on land cover are generally considered temporary when the land cover is restored to preconstruction conditions within 1 year.

The activities listed below could have direct effects on biological resources.

- Vegetation clearing; grading; excavating/trenching; and construction of crane pads, turbine foundations, and batch plants.
- Construction of new dirt or gravel roads and widening of existing roads.
- Temporary stockpiling and sidecasting of soil, construction materials, or other construction wastes.
- Soil compaction, dust, and water runoff from construction sites.
- Increased vehicle traffic.
- Short-term construction-related noise (from equipment) and visual disturbance.
- Degradation of water quality in drainages and other water bodies resulting from construction runoff containing petroleum products.
- Introduction or spread of invasive plant species.
- Operation of wind turbines.
- Reclamation of landscape.
- Maintenance of fire breaks and roads.

The conditions listed below are examples of indirect effects on biological resources.

- Permanent alterations to light and noise levels.
- Damage through toxicity associated with herbicides and rodenticides.

Most of the biological impacts associated with repowering activities analyzed in this section are direct impacts. Where indirect impacts would result from such activities, they are so identified in the impact discussion.

Permanent direct effects on biological resources were quantified using the estimated amount of land cover that would be converted as a result of construction of new facilities. Temporary effects on biological resources were quantified using the estimated amount of land cover that would be temporarily disturbed during project construction but would be restored to preproject conditions within 1 year of disturbance.

For the program, specific locations of facilities and roads are not available. To estimate permanent and temporary impact acreages in the program area, impact information derived from the Golden Hills project description was used to calculate average permanent and temporary areas of disturbance for an 80 MW project using turbines similar to those proposed for the program. These standardized areas of impact were applied to the specifications of the program (see Chapter 2, *Program Description*). The total amounts of permanent and temporary impacts were then allocated to the various land cover types based on the proportion of the program area comprising each land cover type. Accordingly, the estimated permanent and temporary land cover impacts are proportional to the amount of each land cover type in the program area. These estimated impacts are shown in Table 3.4-7.

Table 3.4-7. Estimated Permanent and Temporary Impacts on Land Cover Types in the Program Area[a]

Land Cover Type	Amount in Program Area (acres)	Percent of Total Program Area	Permanent Impact Estimate (acres)[b]		Temporary Impact Estimate (acres)[c]	
			Alt 1	Alt 2	Alt 1	Alt 2
Annual grassland	39,381.63	90.83	598.57	645.80	526.81	568.60
Alkali meadow	555.06	1.28	8.44	9.10	7.42	8.01
Rock outcrop	42.05	0.001	0.01	0.01	0.01	0.01
Northern mixed chaparral/ chamise chaparral	28.65	0.0007	0.00	0.00	0.00	0.00
Northern coastal scrub/Diablan sage scrub	74.51	0.002	0.01	0.01	0.01	0.01
Mixed evergreen forest/oak woodland	582.18	0.01	0.07	0.07	0.06	0.06
Blue oak woodland	163.61	0.004	0.03	0.03	0.02	0.03
Foothill pine–oak woodland	21.11	0.0005	0.00	0.00	0.00	0.00
Mixed willow riparian scrub	39.27	0.0009	0.01	0.01	0.01	0.01
Mixed riparian forest and woodland	9.93	0.0002	0.00	0.00	0.00	0.00
Alkali wetland	483.17	1.11	7.31	7.89	6.44	6.95
Seasonal wetland	81.44	0.002	0.01	0.01	0.01	0.01
Perennial freshwater marsh	0.01	0	0.00	0.00	0.00	0.00
Canal/Aqueduct	158.21	0.004	0.03	0.03	0.02	0.03
Ponds	54.19	0.001	0.01	0.01	0.01	0.01
Reservoirs	176.58	0.004	0.03	0.03	0.02	0.03
Drainages[d]	–	–	–	–	–	–
Cropland	4.55	0.0001	0.00	0.00	0.00	0.00
Developed and Disturbed	1,502.58	0.03	0.20	0.21	0.17	0.19

[a] These impact estimates do not include offset of land cover that is returned to natural conditions from removal of facilities and roads. Therefore, acreages of impacts are likely to be lower than those shown here.

[b] Percent of total program area multiplied by 659 acres (Alternative 1) and 711 acres (Alternative 2) of total permanent impacts associated with the program.

[c] Percent of total program area multiplied by 580 acres (Alternative 1) and 626 acres (Alternative 2) of total temporary impacts associated with the program.

[d] Acreage was not calculated for impacts on drainages. Typically, such impacts are measured in linear feet; these impacts will be quantified when design drawings are available.

It should be noted that siting considerations during design and development of individual projects and implementation of avoidance and minimization measures would likely modify such impacts. For example, because most roads and facilities would not be constructed in low areas where most ponds and wetlands are located, permanent loss of these land cover types is not anticipated. Additionally, impact estimates do not take into account that some developed areas may be returned to natural conditions; such restoration would offset the acreages of affected land cover. Consequently, the estimates in Table 3.4-7 likely exceed the actual impacts that would result from construction.

Land cover impacts associated with the Golden Hills and Patterson Pass projects were determined by overlaying the footprint of the proposed project components on the mapped land cover types and calculating the area of each land cover type that would be permanently and temporarily affected. Permanent and temporary impacts on land cover (and special-status species habitat) resulting from the Golden Hills and Patterson Pass projects are shown in Tables 3.4-8 and 3.4-9, respectively.

Table 3.4-8. Estimated Permanent and Temporary Impacts on Land Cover Types in the Golden Hills Project Area (acres)[a]

		Temporary		
Land Cover	Permanent	Construction	Decommissioning	Associated Wildlife Species
Annual grassland	124.89	91.80	28.47 (existing turbines) 117.00 (roads)	California tiger salamander, western spadefoot, California red-legged frog, western pond turtle, Blainville's horned lizard, Alameda whipsnake, San Joaquin coachwhip, white-tailed kite, northern harrier, Swainson's hawk, golden eagle, western burrowing owl, loggerhead shrike, tricolored blackbird, American badger, San Joaquin kit fox, non–special-special status migratory birds
Alkali meadow	0.30	3.69	–	Same as annual grassland
Ponds	0.15	0.00	–	Vernal pool tadpole shrimp, curved-footed hygrotus diving beetle, California tiger salamander, western spadefoot, California red-legged frog, western pond turtle
Drainages[b]	–		–	Curved-footed hygrotus diving beetle, California tiger salamander, California red-legged frog, foothill yellow-legged frog, western pond turtle

[a] These impact estimates do not include offset of land cover that is returned to natural conditions from removal of facilities and roads. Therefore, acreages of impacts are likely to be lower than those shown here.

[b] Acreage was not calculated for impacts on drainages. Typically, such impacts are measured in linear feet; these impacts will be quantified when design drawings are available.

Table 3.4-9. Permanent and Temporary Impacts (acres) on Land Cover Types in the Patterson Pass Project Area (acres)[a]

		Temporary		
Land Cover	Permanent	Construction	Decommissioning	Associated Wildlife Species
Annual grassland	15.59	56.38	12.34 (existing turbines) 66.00 (roads)	California tiger salamander, western spadefoot, California red-legged frog, western pond turtle, Blainville's horned lizard, Alameda whipsnake, San Joaquin coachwhip, white-tailed kite, northern harrier, Swainson's hawk, golden eagle, western burrowing owl, loggerhead shrike, tricolored blackbird, American badger, San Joaquin kit fox, non–special-special status migratory birds
Seasonal Wetland	–	0.01	–	Longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, curved-footed hygrotus diving beetle, western spadefoot
Perennial freshwater marsh	–	0.02	–	California tiger salamander, California red-legged frog, western pond turtle
Drainages	0.01	0.03	–	Curved-footed hygrotus diving beetle, California tiger salamander, western spadefoot, California red-legged frog, foothill yellow-legged frog, western pond turtle

[a] These impact estimates do not include offset of land cover that is returned to natural conditions from removal of facilities and roads. Therefore, acreages of impacts are likely to be lower than those shown here.

Potential indirect impacts resulting from the program and the two projects were evaluated qualitatively for two reasons: (1) indirect impacts would occur farther from the project area or later in time, and (2) evaluating indirect effects quantitatively would be highly speculative.

Avian Fatality Analysis Methods

Fatality Rates

Estimating the number of birds killed at wind energy facilities is a rapidly developing field, with a variety of metrics, methods, and estimators used to quantify turbine-related avian fatalities. Most commonly used estimators first calculate the *rate* at which birds are killed. Historically, the most commonly used rate has been the number of birds killed *per megawatt* (MW) per year, where MWs are measured as the rated nameplate capacities of the turbines. The rated nameplate capacity of a turbine is the amount of power it can generate under its ideal conditions (different turbines are designed to operate most efficiently under different conditions).

The number of fatalities per MW per year has been used most often because it facilitates comparisons across a number of different turbine types with different sizes and rated nameplate capacities. However, the number of birds killed *per turbine* per year is being used more often at facilities using modern turbines because these larger turbines are reaching a size at which a higher density of turbines is no longer feasible. Consequently, the number of towers becomes relatively more important than the actual rated capacity.

Regardless of the metric used, the fatality rate (expressed either per MW or per turbine) is then multiplied by either the total number of MWs in the facility or the total number of turbines in the facility, respectively, to obtain the estimate of the total number of birds killed each year at the facility.

The baseline estimate of the number of birds killed annually for each project and for the program area was based on the total number of MWs that were installed (referred to as the *total installed capacity*) at the time the Notice of Preparation for this PEIR was filed. The installed capacity at the time the NOP was filed was 329 MW for the program area, 80.5 MW for the Golden Hills project area, and 21.8 MW for the Patterson Pass project area (the program area total includes the capacity of the two project areas).

For the fatality rates, the average of the annual estimates of each fatality rate from the 2005–2011 bird years (n=7 years) provided by the Alameda County Avian Fatality Monitoring Program (ICF International 2013) was based on old-generation turbines only (i.e., results from the Diablo Winds and Buena Vista turbines were excluded because they are not considered old-generation turbines). This average was used because the annual fatality rates vary considerably from year to year.

The analysis was based on five groups of species: focal species, species of local conservation concern, raptors (including owls and turkey vultures), non-raptors, and all birds. *Focal species* were defined in the 2007 Settlement Agreement as American kestrel, burrowing owl, golden eagle, and red-tailed hawk for the purpose of measuring the reduction in raptor fatalities resulting from implementation of management actions. Four additional species (loggerhead shrike [California species of special concern], prairie falcon [CDFW Watch List], Swainson's hawk [listed as threatened under CESA], and barn owl) were added for the analyses in this PEIR because of a high fatality rate, general concerns about the conservation status of these species, or both.

ICF biologists compared the baseline number of fatalities for each species and species group calculated as outlined above to the number of fatalities expected to occur as a result of repowering. The number of fatalities expected to occur as a result of repowering was based on the 417 and 450 MW caps for the two program alternatives and on the size of each of the projects measured in MWs as outlined in the project description. The rates used to calculate the number of fatalities expected to occur as a result of repowering were derived from the rates at three repowering projects in the APWRA that use newer, repowered turbines: Diablo Winds, Buena Vista, and Vasco Winds. Diablo Winds comprises thirty-one 660 kW turbines, Buena Vista thirty-eight 1 MW turbines, and Vasco Winds thirty-four 2.3 MW turbines (Insignia Environmental 2012; Brown et al. 2013; ICF International 2013). Although there is considerable range in turbine sizes among these three projects, they are all considered new-generation turbines relative to the rest of the turbines installed in the APWRA. The annual fatality rates (expressed as fatalities per MW per year) for these three repowering projects are presented in Table 3.4-10, along with the average of the annual fatality rates at nonrepowered turbines for comparison. However, it should be noted that the rate estimates available from new-generation repowered turbines in the APWRA may not be representative of rates that would occur at other locations in the APWRA. This is because the three existing repowered project sites each have different turbine types and are located in three relatively small, distinct areas with site-specific geographic, topographic, and other ecological conditions, and because the primary species of concern are not evenly distributed throughout the APWRA.

Table 3.4-10. Annual Adjusted Fatality Rates for Nonrepowered and Repowered APWRA Turbines

		Repowered		
Species/Group	Nonrepowered[a]	Diablo Winds[b]	Buena Vista[c]	Vasco Winds[d]
American kestrel	0.59	0.09	0.15	0.30
Barn owl	0.24	0.02	0.00	0.03
Burrowing owl	0.78	0.84	–	0.05
Golden eagle	0.08	0.01	0.04	0.03[e]
Loggerhead shrike	0.19	0.00	–	–
Prairie falcon	0.02	–	0.00	–
Red-tailed hawk	0.44	0.20	0.10	0.25
Swainson's hawk	0.00	–	–	–
All raptors	2.43	1.21	0.31	0.64
All native non-raptors	4.50	2.51	1.01	2.09

Notes: fatality rates reflect annual fatalities per MW. "–" denotes that no fatalities were detected. "0.00" signifies that, although fatalities were detected, the rate is lower than two significant digits.

[a] Average of 2005–2011 bird years.

[b] Average of 2005–2009 bird years.

[c] Average of 3 years (2007–2009).

[d] Values from first year of monitoring (2013).

[e] Value updated based on information provided by NextEra Energy Resources on July 21, 2014. Value provided is an average of the adjusted rates from monitoring years 1 (0.016) and 2 (0.048).

Potential Biases in the Avian Fatality Analysis Methods

Several factors confound the comparison of avian fatality rates between old- and new-generation turbines. The fatality rates from nonrepowered turbines were obtained while management actions were being implemented to reduce avian fatalities. These actions included the shutdown of turbines during the winter period, a time when winds are lowest but avian use of the area is highest for three of the four focal species. In addition, hazardous turbines were being removed during the period of data collection. These actions in combination resulted in a reduction of avian fatality rates, tending to underestimate the differences between old-generation turbines and newer turbines because the newer turbines are not shut down during the winter period and none were deemed hazardous enough to warrant removal.

The fatality rates from two of the three repowered projects are associated with turbines considerably smaller than those likely to be used in all future repowering projects. Evidence collected to date suggests that avian fatality rates may decrease as turbine size increases (Smallwood and Karas 2009). Consequently, these rates may be biased high relative to the turbines likely to be used in the two projects described in this PEIR and future projects implemented in the rest of the APWRA. In addition, there is considerable variation in collision risk across the various topographies and geographies of the APWRA, presumably due in part to variations in abundance and use of these areas by different species. For example, burrowing owls were known to be abundant in the area around the Diablo Winds turbines when they were installed, and thus there is a relatively high rate (for new-generation turbines) of fatalities at these turbines. Conversely, no burrowing owl fatalities were detected in the Buena Vista project area in the 3 years of fatality monitoring after repowering. Thus, the fatality rates at the three repowered project sites may not be representative of the fatality rates likely to occur at other repowering project sites. Because of the variation between these projects, fatality rates from all three projects were used to provide a range in the estimates of total annual fatalities likely to occur as a result of repowering.

Finally, one of the biggest differences among all studies is variation in detection probability. *Detection probability* as it is used here refers to the probability that a turbine-related fatality is actually detected. There are various ways of measuring detection probability, the most common being the use of carcass placement trials to measure the rate at which carcasses are removed from the search area and the rate at which searchers detect carcasses given that they are still present. Detection probability varies among searchers, habitat types, seasons, years, and many other factors. The Alameda County Avian Fatality Monitoring Program measured detection probabilities in only one year, and these probabilities were used to estimate the number of killed birds in all years of the study. If detection probability varies considerably across years, such variation can also confound to an unknown degree comparisons of fatality rates and estimates of total fatalities across projects.

Differences in search radius may constitute an additional bias affecting the analysis. There is some debate in the scientific community regarding the appropriate search radii; consequently, fatality rates for new-generation turbines may have a potential and as yet unknown bias.

Bat Fatality Analysis Methods

Fatality Rates

The assessment of bat species potentially at risk is based on a review of existing bat fatality data for the APWRA, species occurrence data in and around the program and project areas, the current understanding of those species' susceptibility to fourth-generation turbine–related mortality, and known trends in bat fatalities at wind energy facilities in general.

Methods used to conduct the analysis were similar to those used to assess the potential impacts on avian species. The total installed capacity at the time the NOP for this PEIR was filed was used to estimate the baseline number of fatalities that would occur if the old-generation turbines were to continue operating without any repowering. This value was multiplied by the fatality rate for bats provided by Smallwood and Karas (2009:1066) using data from the AFMT for the 2005–2007 bird years to obtain estimates of total bat fatalities per year for the program and the two projects. These numbers were compared to the number of fatalities expected to occur if old-generation turbines were replaced with newer, modern turbines. The number of fatalities expected to occur as a result of repowering was based on the 417 MW cap for the program area and the size of each of the projects measured in MWs as outlined in the project description.

Estimates of bat fatality rates from several sources were used to provide a range of bat fatality estimates that could occur as a result of repowering. The primary source, Vasco Winds, was supplemented with bat fatality rate estimates from the two other repowering projects in the APWRA—Diablo Winds and Buena Vista—both of which used turbines smaller than those used in current and future repowering projects. Bat fatality rates from the nearby Montezuma Hills Wind Resource Area were also used because this is the nearest area—beyond Vasco Winds—where fourth-generation turbines are in operation. The resultant range of possible fatality rates was compared to the baseline estimates of total fatalities for the two project areas and the program area.

Potential Biases in the Bat Fatality Analysis Methods

Although the best available evidence was used to estimate the number of bat fatalities potentially resulting from implementation of the proposed program and projects, there is more uncertainty in these estimates than there is for bird fatality estimates. Because the Alameda County Avian Fatality Program was not designed to count bats, the baseline fatality rate is likely underestimated. Moreover, because Vasco Winds is not representative of the entire program area, extrapolation of results from this site to other areas should be interpreted with caution. Finally, the nearby Montezuma Hills Wind Resource Area, while sharing some land use characteristics (e.g., grazing), supports more dryland farming than the APWRA and has a different topographical profile.

Determination of Significance

The basis for determining when a given impact exceeds the threshold of significance—that is, when it has a substantial adverse effect—was determined by the professional judgment of qualified biologists. Under long-established CEQA practice and principle, such determinations are derived from comparison with the baseline of existing conditions, as the focus of CEQA is on "substantial adverse effect" as a change from existing conditions. The analysis of impacts on biological resources, and in particular on avian species in the program area, accordingly, entailed the comparison of the existing condition of regular and more or less predictable levels of avian mortality associated with the existing wind turbines—the baseline mortality rate defined above in *Avian Fatality Analysis Methods*—with the anticipated or calculated projection of the mortality rate that would result from implementation of the program or projects. Where the projected rate would exceed the baseline rate, the impact would typically be significant; if the projected rate is below the baseline rate, the impact would typically be considered less than significant. The County considered several issues involving use of the typical determination of significance outlined above.

- The baseline condition is one that already results in a substantial number of avian fatalities, which in itself constitutes a significant impact.
- Avian mortality consists of a series of temporal, moment-to-moment events; accordingly, it cannot be viewed as a constant in the way that other baseline environmental conditions, such as presence of existing habitat areas, landscape features, or an earthquake fault, can be viewed.
- Estimation of fatality rates from existing and new-generation turbines is, as discussed in the impact analysis, variable and uncertain.
- A determination of significance would be appropriate if wind turbine operations could violate specific laws and regulations (e.g., ESA, CESA, MBTA) that are not tied to mortality rates.
- Commitments were agreed to by the majority of the wind operators, documented in the 2007 Settlement Agreement, to achieve a 50% reduction in avian fatalities of annual fatalities of four focal species (golden eagle, burrowing owl, American kestrel, and red-tailed hawk) through implementation of the Avian Wildlife Protection Program and Schedule (AWPPS) as established in 2005 and modified in 2007.

Accordingly, in view of the foregoing considerations, the fact that even reduced avian fatalities could violate specific laws and regulations, and the conservation approach described in the 2007 Settlement Agreement, the County has determined that the threshold of significance for impacts on avian species is effectively any level of avian mortality above zero.

In accordance with Appendix G of the State CEQA Guidelines, the program alternatives and the Patterson Pass and Golden Hills projects would be considered to have a significant effect if the program or project 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 California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.
- 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 California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (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.
- Substantially reduce the habitat of a common plant or wildlife species, cause a plant or wildlife population to drop below self-sustaining levels, or threaten to eliminate a plant or animal community.
- 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 HCP, NCCP, or other approved local, regional, or state habitat conservation plan.

Impacts and Mitigation Measures

The following discussion assesses potential impacts on biological resources resulting from implementation of the program and the Golden Hills and Patterson Pass projects. Wildlife species with similar habitat use (e.g., tree-nesting species) were grouped in the impact discussions below.

Mitigation measures for potential impacts of the program and Patterson Pass and Golden Hills projects were developed to be consistent with the avoidance, minimization, and mitigation measures set forth in the East Alameda County Conservation Strategy (EACCS or Conservation Strategy). The Conservation Strategy was developed to assist with environmental compliance requirements of ESA, CESA, CEQA, NEPA, and other applicable laws for all projects within the area covered by the strategy that would have impacts on biological resources. The Conservation Strategy establishes goals and objectives and a compensation program to offset impacts from projects in the covered area. The program area lies within the area covered by the Conservation Strategy. Where applicable, the goals and objectives in the Conservation Strategy were used to develop mitigation measures to minimize potential impacts resulting from the program and the individual projects addressed in this EIR. Likewise, compensatory mitigation for the program and individual projects refers to mitigation ratios from the Conservation Strategy. In the event that take authorization is obtained for any species listed under ESA, CESA, or BGEPA, avoidance, minimization, and compensatory mitigation will be undertaken in accordance with the authorization in consultation with USFWS and/or CDFW. Implementation of state and federal requirements contained in such authorization will constitute compliance with corresponding measures in this PEIR.

Impact BIO-1a-1: Potential for ground-disturbing activities to result in adverse effects on special-status plants or habitat occupied by special-status plants—program Alternative 1: 417 MW (less than significant with mitigation)

Ground-disturbing activities associated with Alternative 1 could result in adverse effects on special-status plants or their habitat. Direct effects include those effects where plants may be removed, damaged, or crushed (seedlings) by ground-disturbing activities, the movement or parking of vehicles, and/or the placement of equipment and supplies. Ground disturbance can kill or damage mature individuals or eliminate their habitat. Excavation alters soil properties and may create conditions unsuitable for the growth of some species or favor their replacement by other species. The roots of shrubs and other perennial species are susceptible to damage from soil compaction by equipment or construction materials. Possible indirect effects on plants could result from erosion that degrades habitat or accidental ignition of a fire that damages or kills individuals. Because these ground-disturbing activities could have substantial adverse effects on special-status plant species, this impact is significant. Implementation of Mitigation Measures BIO-1a through BIO-1e would reduce this impact to a less-than-significant level.

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

Project proponents will conduct surveys for the special-status plant species within and adjacent to all project sites. All surveys will be conducted by qualified biologists in accordance with the appropriate protocols.

Special-status plant surveys will be conducted in accordance with *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. No more than 3 years prior to ground-disturbing repowering activities and during the appropriate identification periods for special-status plants (Table 3.4-4), a qualified biologist (as determined by Alameda County) will conduct field surveys within decommissioning work areas, proposed construction areas, and the immediately adjacent areas to determine the presence of habitat for special-status plant species. The project proponent will submit a report documenting the survey results to Alameda County for review and approval prior to conducting any repowering activities. The report will include the location and description of all proposed work areas, the location and description of all suitable habitat for special-status plant species, and the location and description of other sensitive habitats (e.g., vernal pools, wetlands, riparian areas). Additionally, the report will outline where additional species and/or habitat-specific mitigation measures are required. This report will provide the basis for any applicable permit applications where incidental take of listed species may occur.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

Project proponents will ensure that the following BMPs, in accordance with practices established in the EACCS, will be incorporated into individual project design and construction documents.

- Employees and contractors performing decommissioning and reclamation activities will receive environmental sensitivity training. Training will include review of environmental laws, mitigation measures, permit conditions, and other requirements that must be followed by all personnel to reduce or avoid effects on special-status species during construction activities.

- Environmental tailboard trainings will take place on an as-needed basis in the field. These trainings 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 and reclamation activities. Directors, managers, superintendents, and the crew leaders will be responsible for ensuring that crewmembers comply with the guidelines.
- Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas to the extent practicable.
- Offroad vehicle travel will be avoided.
- 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, project 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.
- 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.
- Erosion control measures will be implemented 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. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.
- 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).
- 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 (except for safety in remote locations).

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

Where surveys determine that a special-status plant species is present in or adjacent to a project area, direct and indirect impacts of the project on the species will be avoided through the establishment of activity exclusion zones, within which no ground-disturbing activities will take place, including construction of new facilities, construction staging, or other temporary work areas. Activity exclusion zones for special-status plant species will be established around each occupied habitat site, the boundaries of which will be clearly marked with standard orange plastic construction exclusion fencing or its equivalent. The establishment of activity exclusion zones will not be required if no construction-related disturbances will occur within 250 feet of the occupied habitat. 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-1d: Compensate for impacts on special-status plant species

All project proponents will avoid or minimize temporary and permanent impacts on special-status plants that occur on project sites and will compensate for impacts on special-status plant species. Although all impacts on large-flowered fiddleneck, diamond-petaled California poppy, and caper-fruited tropidocarpum will be avoided, impacts on other special-status plant species will be avoided to the extent feasible, and any unavoidable impacts will be addressed through compensatory mitigation.

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 will be compensated for through the acquisition, protection, and subsequent management in perpetuity of other existing occurrences at a 2:1 ratio (occurrences impacted: occurrences preserved). The project proponent will provide detailed information to the County and CDFW on the location of the preserved occurrences, quality of the preserved habitat, feasibility of protecting and managing the areas in-perpetuity, responsibility parties, and other pertinent information. If suitable occurrences of a special-status plant species are not available for preservation, then the project will be redesigned to remove features that would result in impacts on that species.

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

All project proponents will retain a qualified biologist (as determined by Alameda County) to conduct periodic monitoring of decommissioning, repowering, and reclamation activities that occur adjacent to sensitive biological resources (e.g., special-status species, sensitive vegetation communities, wetlands). Monitoring will occur during initial ground disturbance where sensitive biological resources are present and weekly thereafter or as determined by the County in coordination with a qualified biologist. 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 project proponent or its contractors maintain exclusion areas adjacent to sensitive biological resources, and for documenting compliance with all biological resources– related mitigation measures.

Impact BIO-1a-2: Potential for ground-disturbing activities to result in adverse effects on special-status plants or habitat occupied by special-status plants—program Alternative 2: 450 MW (less than significant with mitigation)

Ground-disturbing activities associated with Alternative 2 could result in adverse effects on special-status plants or their habitat. Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Direct effects include those where plants may be removed, damaged, or crushed (seedlings) by ground-disturbing activities, the movement or parking of vehicles, and/or the placement of equipment and supplies. Ground disturbance can kill or damage mature individuals or eliminate their habitat. Excavation alters soil properties and may create conditions unsuitable for the growth of some species or favor their replacement by other species. The roots of shrubs and other perennial species are susceptible to damage from soil compaction by equipment or construction materials. Possible indirect effects on plants could result from erosion that degrades habitat or accidental ignition of a fire that damages or kills individuals. Because these ground-disturbing activities could have substantial adverse effects on special-status plant species, this impact is significant. Implementation of Mitigation Measures BIO-1a through BIO-1e would reduce this impact to a less-than-significant level.

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

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

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

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

Impact BIO-1b: Potential for ground-disturbing activities to result in adverse effects on special-status plants or habitat occupied by special-status plants—Golden Hills Project (less than significant with mitigation)

Ground-disturbing activities associated with the Golden Hills Project could result in adverse effects on special-status plants or their habitat. Direct effects include those effects where plants may be removed, damaged, or crushed (seedlings) by ground-disturbing activities, the movement or parking of vehicles, and/or the placement of equipment and supplies. Ground disturbance can kill or damage mature individuals or eliminate their habitat. Excavation alters soil properties and may create conditions unsuitable for the growth of some species or favor their replacement by other species. The roots of shrubs and other perennial species are susceptible to damage from soil compaction by equipment or construction materials. Possible indirect effects on plants could result from erosion that degrades habitat or accidental ignition of a fire that damages or kills individuals. Because these ground-disturbing activities could have substantial adverse effects on special-status plant species, this impact is significant. Implementation of Mitigation Measures BIO-1a through BIO-1e would reduce this impact to a less-than-significant level.

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

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

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

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

Impact BIO-1c: Potential for ground-disturbing activities to result in adverse effects on special-status plants or habitat occupied by special-status plants—Patterson Pass Project (less than significant with mitigation)

Ground-disturbing activities associated with the Patterson Pass Project could result in adverse effects on special-status plants or their habitat. Direct effects include those effects where plants may be removed, damaged, or crushed (seedlings) by ground-disturbing activities, the movement or parking of vehicles, and/or the placement of equipment and supplies. Ground disturbance can kill or damage mature individuals or eliminate their habitat. Excavation alters soil properties and may create conditions unsuitable for the growth of some species or favor their replacement by other species. The roots of shrubs and other perennial species are susceptible to damage from soil compaction by equipment or construction materials. Possible indirect effects on plants could result from erosion that degrades habitat or accidental ignition of a fire that damages or kills individuals. Because these ground-disturbing activities could have substantial adverse effects on special-status plant species, this impact is significant. Implementation of Mitigation Measures BIO-1a through BIO-1e would reduce this impact to a less-than-significant level.

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

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

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

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

Impact BIO-2a-1: Adverse effects on special-status plants and natural communities resulting from the introduction and spread of invasive plant species—program Alternative 1: 417 MW (less than significant with mitigation)

Construction activities have the potential to facilitate the introduction and spread of invasive nonnative plant species by removing vegetation and disturbing soils. Construction vehicles and machinery are primary vectors for the spread of such species. Invasive species compete with native species for resources and can alter natural communities by influencing fire regimes, hydrology (e.g., sedimentation and erosion), light availability, nutrient cycling, and soil chemistry (Randall and Hoshovsky 2000). Invasive species also have the potential to harm human health and the economy by adversely affecting natural ecosystems, recreation, agricultural lands, and developed areas (California Department of Fish and Game 2008). The introduction and spread of invasive nonnative plant species as a result of activities associated with the program would constitute a significant indirect impact. However, implementation of Mitigation Measures BIO-1b, BIO-2, BIO-5c, and WQ-1 would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

Mitigation Measure BIO-2: Prevent introduction, spread, and establishment of invasive plant species

To avoid and minimize the introduction and spread of invasive nonnative plant species, all project proponents will implement the following BMPs.

- Construction vehicles and machinery will be cleaned prior to entering the construction area. Cleaning stations will be established at the perimeter of the construction area along all construction routes or immediately offsite.
- 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, as allowed by state and federal regulation of stormwater runoff.

In addition, the project proponents will prepare and implement erosion and sediment control plans to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas affected by construction activities (Mitigation Measures BIO-1b and WQ-1) . Prior to initiating any construction activities that will result in temporary impacts on natural communities, a restoration and monitoring plan will be developed for temporarily affected habitats in each project area (Mitigation Measure BIO-5c). Restoration and monitoring plans will be submitted to the County and CDFW for approval. These plans will include methods for restoring soil conditions and revegetating disturbed areas, seed mixes, monitoring and maintenance schedules, adaptive management strategies, reporting requirements, and success criteria. Following completion of project construction, the project proponents will implement the revegetation plans to restore areas disturbed by project activities to a condition of equal or greater habitat function than occurred prior to the disturbance.

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

See discussion on pages 3.4-78 and 3.4-79.

Mitigation Measure WQ-1: Comply with NPDES requirements

See discussion on pages 3.9-8 and 3.9-9.

Impact BIO-2a-2: Adverse effects on special-status plants and natural communities resulting from the introduction and spread of invasive plant species—program Alternative 2: 450 MW (less than significant with mitigation)

Construction activities have the potential to facilitate the introduction and spread of invasive nonnative plant species by removing vegetation and disturbing soils. Construction vehicles and machinery are primary vectors for the spread of such species. Invasive species compete with native species for resources and can alter natural communities by influencing fire regimes, hydrology (e.g., sedimentation and erosion), light availability, nutrient cycling, and soil chemistry (Randall and Hoshovsky 2000). Invasive species also have the potential to harm human health and the economy by adversely affecting natural ecosystems, recreation, agricultural lands, and developed areas (California Department of Fish and Game 2008). The introduction and spread of invasive nonnative plant species as a result of activities associated with the program would constitute a significant indirect impact. Effects under Alternative 2 would be the same as those under Alternative 1. Although the area of disturbance would be 8% greater under Alternative 2, the severity of the effects of introduction and spread of invasive plant species does not necessarily correlate directly to the areal extent of disturbance, but rather to the practices that facilitate introduction. Implementation of Mitigation Measure BIO-2 would reduce this impact to a level less-than-significant level.

Mitigation Measure BIO-2: Prevent introduction, spread, and establishment of invasive plant species

Impact BIO-2b: Adverse effects on special-status plants and natural communities resulting from the introduction and spread of invasive plant species—Golden Hills Project (less than significant with mitigation)

Construction activities have the potential to facilitate the introduction and spread of invasive nonnative plant species by removing vegetation and disturbing soils. Construction vehicles and machinery are primary vectors for the spread of such species. Invasive species compete with native species for resources and can alter natural communities by influencing fire regimes, hydrology (e.g., sedimentation and erosion), light availability, nutrient cycling, and soil chemistry (Randall and Hoshovsky 2000). Invasive species also have the potential to harm human health and the economy by adversely affecting natural ecosystems, recreation, agricultural lands, and developed areas (California Department of Fish and Game 2008). The introduction and spread of invasive nonnative plant species as a result of activities associated with the Golden Hills Project would constitute a significant indirect impact. However, implementation of Mitigation Measure BIO-2 would reduce this impact to a level less-than-significant level.

Mitigation Measure BIO-2: Prevent introduction, spread, and establishment of invasive plant species

Impact BIO-2c: Adverse effects on special-status plants and natural communities resulting from the introduction and spread of invasive plant species—Patterson Pass Project (less than significant with mitigation)

Construction activities have the potential to facilitate the introduction and spread of invasive nonnative plant species by removing vegetation and disturbing soils. Construction vehicles and machinery are primary vectors for the spread of such species. Invasive species compete with native species for resources and can alter natural communities by influencing fire regimes, hydrology (e.g., sedimentation and erosion), light availability, nutrient cycling, and soil chemistry (Randall and Hoshovsky 2000). Invasive species also have the potential to harm human health and the economy by adversely affecting natural ecosystems, recreation, agricultural lands, and developed areas (California Department of Fish and Game 2008). The introduction and spread of invasive nonnative plant species as a result of activities associated with the Patterson Pass Project would constitute a significant indirect impact. However, implementation of Mitigation Measure BIO-2 would reduce this impact to a level less-than-significant level.

Mitigation Measure BIO-2: Prevent introduction, spread, and establishment of invasive plant species

Impact BIO-3a-1: Potential mortality of or loss of habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle—program Alternative 1: 417 MW (less than significant with mitigation)

Construction activities in the program area could result in direct effects on longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp (vernal pool branchiopods), and curved-footed hygrotus diving beetle or their habitats. The majority of construction activities would take place on grassland habitat along ridgelines; consequently, loss of potential vernal pool branchiopod and curved-footed hygrotus diving beetle habitat would generally be avoided. However, direct impacts on habitat associated with road construction or widening and impacts on water quality could result from some construction activities. Estimated permanent and temporary impacts on alkali wetland, seasonal wetland, and ponds that may provide habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle are shown in Table 3.4-7. Impacts on drainages that may provide potential habitat for the beetle could not be estimated because these features have not yet been delineated. Construction activities such as excavation, grading, or stockpiling of soil, could fill, remove, or otherwise alter suitable habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle and could result in injury or mortality of these species. Such ground-disturbing activities may be associated with installation of power collection and communication systems and road construction and widening. Vernal pool branchiopods and curved-footed hygrotus diving beetles could also be injured or killed if vehicles or construction equipment are driven through occupied habitat, or if gasoline, oil, or other contaminants enter their habitat. Changes in hydrology or sedimentation of habitat from erosion associated with project construction could alter the suitability of habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle and could cause mortality.

Operation and maintenance activities may also result in impacts on vernal pool branchiopods or their habitats. Use of herbicides near occupied habitat could result in mortality or reduced fitness of vernal pool branchiopods (U.S. Fish and Wildlife Service 1996). Herbicide or pesticide use near or upstream of suitable habitat for curved-footed hygrotus diving beetle could result in mortality or reduced fitness of the beetle. Road and firebreak maintenance may also result in degradation of habitat or injury or mortality of vernal pool branchiopods and curved-footed hygrotus diving beetles. These impacts would be significant because the project could reduce the local populations of federally listed vernal pool branchiopods and a rare beetle species through direct mortality and habitat loss. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3a, and BIO-3b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

No more than 3 years prior to ground-disturbing repowering activities, a qualified biologist (as determined by Alameda County) will conduct field surveys within decommissioning, repowering, and restoration work areas and their immediate surroundings to determine the presence of habitat for special-status wildlife species. The project proponent will submit a report documenting the survey results to Alameda County for review prior to conducting any repowering activities. The report will include the location and description of all proposed work areas, the location and description of all suitable habitat for special-status wildlife species, and the location and description of other sensitive habitats (e.g., vernal pools, wetlands, riparian areas). Additionally, the report will outline where additional species- and/or habitat-specific mitigation measures are required. This report may provide the basis for any applicable permit applications where incidental take may occur.

Mitigation Measure BIO-3b: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle

Where suitable habitat for listed vernal pool branchiopods and curved-footed hygrotus diving beetle are identified within 250 feet (or another distance as determined by a qualified biologist based on topography and other site conditions) of proposed work areas, the following measures will be implemented to ensure that the repowering projects do not have adverse impacts on listed vernal pool branchiopods or curved-footed hygrotus diving beetle. These measures are based on measures from the EACCS, with some modifications and additions. Additional conservation measures or conditions of approval may be required in applicable project permits (e.g., ESA incidental take permit).

- Avoid all direct impacts on sandstone rock outcrop vernal pools.
- Ground disturbance will be avoided from the first day of the first significant rain (1 inch or more) until June 1, or until pools remain dry for 72 hours and no significant rain is forecast on the day of such ground disturbance.
- If vernal pools, clay flats, alkaline pools, ephemeral stock tanks (or ponds), sandstone pools, or roadside ditches are present within 250 feet of the work area (or another appropriate

distance as determined by a qualified biologist on the basis of topography and other site conditions), the biologist will stake and flag an exclusion zone prior to construction activities. The width of the exclusion zone will be based on site conditions and will be the maximum practicable distance that ensures protection of the feature from direct and indirect effects of the project. Exclusion zones will be established around features whether they are wet or dry at the time. The exclusion zone will be fenced with orange construction zone and erosion control fencing (to be installed by construction crew).

- No herbicide will be applied within 100 feet of exclusion zones, except when applied to cut stumps or frilled stems or injected into stems. No broadcast applications will be allowed.
- Avoid modifying or changing the hydrology of aquatic habitats.
- Minimize the work area for stream crossings and conduct work during the dry season (June 1 through the first significant rain of the fall/winter).
- Install utility collection lines across perennial creeks by boring under the creek.

Where impacts cannot be avoided or minimized, compensatory mitigation will be undertaken in accordance with mitigation ratios and requirements developed under the EACCS (Appendix C). In the event that an incidental take permit is required, compensatory mitigation will be undertaken in accordance with the terms of the permit in consultation with USFWS.

Impact BIO-3a-2: Potential mortality of or loss of habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle—program Alternative 2: 450 MW (less than significant with mitigation)

Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Construction activities in the program area could result in direct effects on vernal pool branchiopods and curved-footed hygrotus diving beetle or their habitats. The majority of construction activities would take place on grassland habitat along ridgelines; consequently, loss of potential vernal pool branchiopod and curved-footed hygrotus diving beetle habitat would generally be avoided. However, direct impacts on habitat associated with road construction or widening and impacts on water quality could result from some construction activities. Estimated permanent and temporary impacts on alkali wetland, seasonal wetland, and ponds that may provide habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle are shown in Table 3.4-7. Impacts on drainages that may provide potential habitat for the beetle could not be estimated because these features have not yet been delineated. Construction activities such as excavation, grading, or stockpiling of soil, could fill, remove, or otherwise alter suitable habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle and could result in injury or mortality of these species. Such ground-disturbing activities may be associated with installation of power collection and communication systems and road construction and widening. Vernal pool branchiopods and curved-footed hygrotus diving beetles could also be injured or killed if vehicles or construction equipment are driven through occupied habitat, or if gasoline, oil, or other contaminants enter their habitat. Changes in hydrology or sedimentation of habitat from erosion associated with project construction could alter the suitability of habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle and could cause mortality.

Operation and maintenance activities may also result in impacts on vernal pool branchiopods or their habitats. Use of herbicides near occupied habitat could result in mortality or reduced fitness of vernal pool branchiopods (U.S. Fish and Wildlife Service 1996). Herbicide or pesticide use near or upstream of suitable habitat for curved-footed hygrotus diving beetle could result in mortality or reduced fitness of the beetle. Road and firebreak maintenance may also result in degradation of habitat or injury or mortality of vernal pool branchiopods and curved-footed hygrotus diving beetles. These impacts would be significant because the project could reduce the local populations of federally listed vernal pool branchiopods and a rare beetle species through direct mortality and habitat loss. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3a, and BIO-3b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-3b: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle

Impact BIO-3b: Potential mortality of or loss of habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle—Golden Hills Project (less than significant with mitigation)

Impacts from construction, operation, and maintenance of the Golden Hills project on vernal pool branchiopods and curved-footed hygrotus diving beetle would be similar to those described above for the program. The majority of construction activities would take place on grassland habitat along ridgelines; consequently, loss of potential vernal pool branchiopod and curved-footed hygrotus diving beetle habitat would generally be avoided. However, direct impacts on habitat associated with road construction or widening and impacts on water quality could result from some construction activities. Estimated permanent and temporary impacts on alkali wetland, seasonal wetland, and ponds that may provide habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle are shown in Table 3.4-8. Impacts on drainages that may provide potential habitat for the beetle could not be estimated because these features have not yet been delineated. These impacts would be significant because the project could reduce the local populations of federally listed vernal pool branchiopods and a rare beetle species through direct mortality and habitat loss. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3a, and BIO-3b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-3b: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle

Impact BIO-3c: Potential mortality of or loss of habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle—Patterson Pass Project (less than significant with mitigation)

The seasonal wetland that provides suitable habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle would not be filled or removed. However, mortality of these aquatic species could occur if oil or other contaminants enter the wetland during construction. Additionally, the seasonal wetland could be indirectly affected if the hydrology of the wetland is modified as a result of project construction. Small areas of other seasonal wetlands and stream/freshwater marsh that may provide suitable habitat for curved-footed hygrotus diving beetle would be temporarily affected during construction of collector lines. None of the ponds that provide suitable habitat for curved-footed hygrotus diving beetle would be filled or removed. Estimated permanent and temporary impacts on seasonal wetland and stream/freshwater marsh that may provide habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle are shown in Table 3.4-9. These impacts would be significant because the project could reduce the local populations of federally listed vernal pool branchiopods and a rare beetle species through direct mortality or habitat loss. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3a, and BIO-3b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-3b: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle

Impact BIO-4a-1: Potential disturbance or mortality of and loss of suitable habitat for valley elderberry longhorn beetle—program Alternative 1: 417 MW (less than significant with mitigation)

Removal of habitat (elderberry shrubs) and potential injury or mortality of valley elderberry longhorn beetle associated with removal of elderberry shrubs would be considered direct effects on the species. Trimming of elderberry branches 1 inch or more in diameter could also result in injury or mortality of valley elderberry longhorn beetle. Because valley elderberry longhorn beetle larvae may feed on the roots of elderberries, disturbance of elderberry roots within the shrub dripline could also result in injury or mortality of individuals. Reduction of water infiltration to elderberry shrubs caused by changes in topography or compaction of soil from construction could result in reduced shrub vigor/vitality and an associated decrease in shoot, leaf, and flower production and could ultimately reduce the suitability of the shrubs to provide habitat for valley elderberry longhorn beetle.

Operations and maintenance activities such as use of herbicides may also affect valley elderberry longhorn beetle or its habitat. Valley elderberry longhorn beetles could be indirectly affected if there is a loss of connectivity between elderberry shrubs when elderberries or associated vegetation is removed. Removal of such vegetation could result in gaps in vegetation that are too wide for beetles to cross because of their fairly limited movement distances (Talley et al. 2006), resulting in separation of individuals or reducing the possibility of colonization of adjacent areas. Although more research is needed, valley elderberry longhorn beetles have been observed to fly a mile or more in contiguous or fairly contiguous habitat, and exit holes have been observed on isolated shrubs 0.25 mile (0.4 kilometer) or more from the next nearest elderberry (Arnold pers. comm.). Because elderberries are expected to be widely separated due to the limited amount of riparian habitat in the program area, the removal of any elderberry shrubs could constitute a significant impact. Any of these impacts could be significant because they could reduce the local population size of a federally listed species through direct mortality or habitat loss. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-4a, and BIO-4b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle

If it is determined through preconstruction surveys conducted pursuant to Mitigation Measure BIO-3a that elderberry shrubs are present within proposed work areas or within 100 feet of these areas, the following measures will be implemented to ensure that the proposed project does not have a significant impact on valley elderberry longhorn beetle.

- Avoid removal of elderberry shrubs.
- Elderberry shrubs/clusters within 100 feet of the construction area that will not be removed will be protected during construction. A qualified biologist (i.e., with elderberry/VELB experience) will mark the elderberry shrubs and clusters that will be protected during construction. Orange construction barrier fencing will be placed at the edge of the buffer areas. The buffer area distances will be proposed by the biologist and approved by USFWS. No construction activities will be permitted within the buffer zone other than those activities necessary to erect the fencing. Signs will be posted every 50 feet (15.2 meters) along the perimeter of the buffer area fencing. The signs will contain the following information: *This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment.*

- Buffer area fences around elderberry shrubs will be inspected weekly by a qualified biological monitor during ground-disturbing activities and monthly after ground-disturbing activities until project construction is complete or until the fences are removed, as approved by the biological monitor and the resident engineer. The biological monitor will be responsible for ensuring that the contractor maintains the buffer area fences around elderberry shrubs throughout construction. Biological inspection reports will be provided to the project proponent and USFWS.

Mitigation Measure BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle

If elderberry shrubs cannot be avoided and protected as outlined in Mitigation Measure 4a, the project proponent will obtain an incidental take permit from USFWS and compensate for the loss of any elderberry shrubs. Surveys of elderberry shrubs to be transplanted will be conducted by a qualified biologist prior to transplantation. Surveys will be conducted in accordance with the *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (U.S. Fish and Wildlife Service 1999). Survey results and an analysis of the number of elderberry seedlings/cuttings and associated native plants based on the survey results will be submitted to USFWS in a biological assessment or an HCP. After receipt of an incidental take permit and before construction begins, the project proponent will compensate for direct effects on elderberry shrubs by transplanting shrubs that cannot be avoided to a USFWS-approved conservation area. Elderberry seedlings or cuttings and associated native species will also be planted in the conservation area. Each elderberry stem measuring 1 inch or more in diameter at ground level that is adversely affected (i.e., transplanted or destroyed) will be replaced, in the conservation area, with elderberry seedlings or cuttings at a ratio ranging from 1:1 to 8:1 (new plantings to affected stems). The numbers of elderberry seedlings/cuttings and associated riparian native trees/shrubs to be planted as replacement habitat are determined by stem size class of affected elderberry shrubs, presence or absence of exit holes, and whether the shrub lies in a riparian or nonriparian area. Stock of either seedlings or cuttings would be obtained from local sources.

At the discretion of USFWS, shrubs that are unlikely to survive transplantation because of poor condition or location, or a plant that would be extremely difficult to move because of access problems, may be exempted from transplantation. In cases where transplantation is not possible, minimization ratios would be increased to offset the additional habitat loss.

The relocation of the elderberry shrubs will be conducted according to USFWS-approved procedures outlined in the Conservation Guidelines (U.S. Fish and Wildlife Service 1999). Elderberry shrubs within the project construction area that cannot be avoided will be transplanted during the plant's dormant phase (November through the first 2 weeks of February). A qualified biological monitor will remain onsite while the shrubs are being transplanted.

Evidence of valley elderberry longhorn beetle occurrence in the conservation area, the condition of the elderberry shrubs in the conservation area, and the general condition of the conservation area itself will be monitored over a period of 10 consecutive years or for 7 years over a 15-year period from the date of transplanting. The project proponent will be responsible for funding and providing monitoring reports to USFWS in each of the years in which a monitoring report is required. As specified in the Conservation Guidelines, the report will include information on timing and rate of irrigation, growth rates, and survival rates and mortality.

Impact BIO-4a-2: Potential disturbance or mortality of and loss of suitable habitat for valley elderberry longhorn beetle—program Alternative 2: 450 MW (less than significant with mitigation)

Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Removal of elderberry shrubs and potential injury or mortality of valley elderberry longhorn beetle associated with removal of elderberry shrubs would be considered direct effects on the species. Trimming of elderberry branches 1 inch or more in diameter could also result in injury or mortality of valley elderberry longhorn beetle. Because valley elderberry longhorn beetle larvae may feed on the roots of elderberries, disturbance of elderberry roots within the shrub dripline could also result in injury or mortality of individuals. Reduction of water infiltration to elderberry shrubs caused by changes in topography or compaction of soil from construction could result in reduced shrub vigor/vitality and an associated decrease in shoot, leaf, and flower production and could ultimately reduce the suitability of the shrubs to provide habitat for valley elderberry longhorn beetle.

Operations and maintenance activities such as use of herbicides may also affect valley elderberry longhorn beetle or its habitat. Valley elderberry longhorn beetles could be indirectly affected if there is a loss of connectivity between elderberry shrubs when elderberries or associated vegetation is removed. Removal of such vegetation could result in gaps in vegetation that are too wide for beetles to cross because of their fairly limited movement distances (Talley et al. 2006), resulting in separation of individuals or reducing the possibility of colonization of adjacent areas. Although more research is needed, valley elderberry longhorn beetles have been observed to fly a mile or more in contiguous or fairly contiguous habitat, and exit holes have been observed on isolated shrubs 0.25 mile (0.4 kilometer) or more from the next nearest elderberry (Arnold pers. comm.). Because elderberries are expected to be widely separated due to the limited amount of riparian habitat in the program area, the removal of any elderberry shrubs could constitute a significant impact. Any of these impacts could be significant because they could reduce the local population size of a federally listed species through direct mortality or habitat loss. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-4a, and BIO-4b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle

Mitigation Measure BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle

Impact BIO-4b: Potential disturbance or mortality of and loss of suitable habitat for valley elderberry longhorn beetle—Golden Hills Project (less than significant with mitigation)

If elderberry shrubs are present in the Golden Hills project area, they could be affected by project construction and operation. Impacts from construction, operation, and maintenance of the Golden Hills project would be similar to those described for the program. Removal of habitat (elderberry shrubs), injury or mortality of beetles, cutting elderberry branches or roots that are 1 inch or more in diameter, and changes in hydrology would directly affect valley elderberry longhorn beetle. The beetle may also be indirectly affected by operations and maintenance activities such as use of herbicides or through the loss of connectivity between elderberry shrubs when shrubs or associated vegetation are removed. Because elderberries are expected to be widely separated due to the limited amount of riparian habitat in the project vicinity, the removal of any elderberry shrubs could constitute a significant impact. Any of these impacts would be significant because they could reduce the local population size of a federally listed species through direct mortality or habitat loss. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-4a, and BIO-4b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle

Mitigation Measure BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle

Impact BIO-4c: Potential disturbance or mortality of and loss of suitable habitat for valley elderberry longhorn beetle—Patterson Pass Project (less than significant with mitigation)

None of the 39 elderberry shrubs in the Patterson Pass project area would be removed in order to construct the project. One of the shrubs is located within 100 feet of a construction access road and could be subjected to increased levels of dust during construction, potentially leading to reduced vigor of the shrub and consequently affecting valley elderberry longhorn beetle. However, according to Talley et al. (2006b:654–655), an experiment along the American River Parkway (Sacramento County) showed that conditions of elderberry shrubs associated with dust from nearby trails and roads (paved and dirt) did not affect the presence of valley elderberry longhorn beetle. The beetle may also be indirectly affected by operations and maintenance activities such as use of herbicides, which could harm elderberry shrubs and/or the beetle. Impacts on valley elderberry longhorn beetle would be significant because such impacts could reduce the local population size of a federally listed species through direct mortality or habitat loss. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-4a, and BIO-4b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle

Mitigation Measure BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle

Impact BIO-5a-1: Potential disturbance or mortality of and loss of suitable habitat for California tiger salamander, western spadefoot, California red-legged frog, and foothill yellow-legged frog—program Alternative 1: 417 MW (less than significant with mitigation)

Construction activities in the program area could result in direct effects on California tiger salamander, western spadefoot, California red-legged frog, and foothill yellow-legged frog (collectively referred to as special-status amphibians) or their habitats (seasonal wetland, freshwater marsh, mixed willow riparian scrub, ponds, drainages, and surrounding upland areas). Estimated permanent and temporary impacts on seasonal wetland, freshwater marsh, mixed willow riparian scrub, and ponds that may provide habitat for special-status amphibians are shown in Table 3.4-7. Impacts on drainages that may provide potential habitat for California red-legged frog and foothill yellow-legged frog could not be estimated because these features have not yet been delineated. The majority of construction activities would take place on suitable upland grassland dispersal and aestivation habitat for California tiger salamander, western spadefoot, and California red-legged frog. Aquatic habitats for specials-status amphibians would generally be avoided; however, direct impacts on habitat and impacts on water quality could result from road construction or widening activities.

Construction activities such as excavation, grading, or stockpiling of soil, could fill, remove or otherwise alter suitable habitat for special-status amphibians or result in injury or mortality of individual amphibians. 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 affect these species could include installation of power collection and communication systems, turbine construction, road infrastructure construction/maintenance and upgrades, meteorological tower installation and removal, temporary staging area set-up, and reclamation activities. Special-status amphibians could 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 project construction could alter the suitability of their habitat or cause mortality.

Operation and maintenance 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 could result in degradation of habitat or injury or mortality of special-status amphibians. These impacts would be significant because they could reduce the local population sizes of federally listed and sensitive amphibians through direct mortality or habitat loss. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, and BIO-5a through BIO-5c would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians

All project proponents will ensure that BMPs and other appropriate measures, in accordance with measures developed for the EACCS, be incorporated into the appropriate design and construction documents. *Implementation of some of these measures will require that the project proponent obtain incidental take permits from USFWS (California red-legged frog and California tiger salamander) and from CDFW (California tiger salamander only) before construction begins.* Additional conservation measures or conditions of approval may be required in applicable project permits (e.g., ESA or CESA incidental take authorization). The applicant will comply with the State of California State Water Resources Control Board NPDES construction general requirements for stormwater.

- Ground-disturbing activities 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% 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.
- 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 a minimum of 2 weeks 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 habitats 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). Relocation of

western spadefoot and foothill yellow-legged frog requires a letter from CDFW authorizing this activity.

- No monofilament plastic will be used for erosion control.
- All project 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.
- Vehicles will not exceed a speed limit of 15 mph on unpaved roads within natural land cover types, or during offroad travel.
- Trenches or holes 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. Any such features that are left open overnight will be searched each day prior to construction activities to ensure no covered species are trapped. Work will not continue until trapped animals have moved out of open trenches.
- Work crews or the 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 qualified biologist who is USFWS and/or CDFW-approved under a biological opinion and/or incidental take permit for the specific project, will trap and move special-status amphibians in accordance with the relocation plan. Relocation of western spadefoot and foothill yellow-legged frog requires a letter permit from CDFW authorizing this activity.

Mitigation Measure BIO-5b: Compensate for loss of habitat for special-status amphibians

Where impacts on aquatic and upland habitat for special-status amphibians cannot be avoided or minimized, compensatory mitigation will be undertaken in accordance with mitigation ratios and requirements developed under the EACCS (Appendix C). In the event that take authorization is required, compensatory mitigation will be undertaken in accordance with the terms of the authorization in consultation with USFWS and/or CDFW.

Mitigation Measure BIO-5c: 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 permanent roads and turbine pad areas are restored to preproject 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. Imported fill soils will be limited to weed-free topsoil similar in texture, chemical composition, and pH to soils found at the restoration 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 program area and should include native or naturalized, noninvasive species sourced within the project area or from the nearest available location.

- 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 October) for up to 3 years following the year of restoration. The restoration will be considered successful when the percent cover for restored areas is 70% absolute cover of the planted/seeded species compared to the percent absolute cover of nearby reference sites. No more than 5% relative cover of the vegetation in the restoration areas will consist of invasive plant species rated as "high" in Cal-IPC's California Invasive Plant Inventory Database (http://www.cal-ipc.org). Remedial measures prescribed in the plan will include supplemental seeding, weed control, and other actions as determined necessary to achieve the long-term success criteria. Monitoring may be extended if necessary to achieve the success criteria or if drought conditions preclude restoration success. 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. The project proponent will provide evidence that CDFW has reviewed and approved the Grassland Restoration Plan. Additionally, the project proponent will provide annual monitoring reports to the County by January 31 of each year, summarizing the monitoring results and any remedial measures implemented (if any are necessary) during the previous year.

Impact BIO-5a-2: Potential disturbance or mortality of and loss of suitable habitat for California tiger salamander, western spadefoot, California red-legged frog, and foothill yellow-legged frog—program Alternative 2: 450 MW (less than significant with mitigation)

Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Construction activities in the program area could result in direct effects on special-status amphibians or their habitats (seasonal wetland, freshwater marsh, mixed willow riparian scrub, ponds, drainages, and surrounding upland areas). Estimated permanent and temporary impacts on seasonal wetland, freshwater marsh, mixed willow riparian scrub, and ponds that may provide habitat for special-status amphibians are shown in Table 3.4-7. Impacts on drainages that may provide potential habitat for California red-legged frog and foothill yellow-legged frog could not be estimated because these features have not yet been delineated. The majority of construction activities would take place on suitable upland grassland dispersal and aestivation habitat for California tiger salamander, western spadefoot, and California red-legged frog. Aquatic habitats for specials-status amphibians would generally be avoided; however, direct impacts on habitat and impacts on water quality could result from road construction or widening activities.

Construction activities such as excavation, grading, or stockpiling of soil, could fill, remove or otherwise alter suitable habitat for special-status amphibians or result in injury or mortality of individual amphibians. 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 affect these species could include installation of power collection and communication systems, turbine construction, road infrastructure construction/maintenance and upgrades, meteorological tower installation and removal, temporary staging area set-up, and reclamation activities. Special-status amphibians could 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 project construction could alter the suitability of their habitat or cause mortality.

Operation and maintenance 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 could result in degradation of habitat or injury or mortality of special-status amphibians. These impacts would be significant because they could reduce the local population sizes of federally listed and sensitive amphibians through direct mortality or habitat loss. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, and BIO-5a through BIO-5c would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians

Mitigation Measure BIO-5b: Compensate for loss of habitat for special-status amphibians

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Impact BIO-5b: Potential disturbance or mortality of and loss of suitable habitat for California tiger salamander, western spadefoot, California red-legged frog, and foothill yellow-legged frog—Golden Hills Project (less than significant with mitigation)

Impacts from construction, operation, and maintenance of the Golden Hills Project would be similar to those described for the program. The majority of construction activities would take place on potential upland grassland dispersal and aestivation habitat for California tiger salamander, western spadefoot, and California red-legged frog. Aquatic habitats for specials-status amphibians would generally be avoided; however, direct impacts on habitat and impacts on water quality could result from road construction or widening activities. Estimated permanent and temporary impacts on seasonal wetland, mixed willow riparian forest, and ponds that may provide habitat for special-status amphibians are shown in Table 3.4-8. Impacts on drainages that may provide potential habitat for California red-legged frog and foothill yellow-legged frog could not be estimated because these features have not yet been delineated. These impacts would be significant because they could reduce the local population sizes of federally listed and sensitive amphibians through direct mortality or habitat loss. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, and BIO-5a through BIO-5c would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians

Mitigation Measure BIO-5b: Compensate for loss of habitat for special-status amphibians

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Impact BIO-5c: Potential disturbance or mortality of and loss of suitable habitat for California tiger salamander, western spadefoot, California red-legged frog, and foothill yellow-legged frog—Patterson Pass Project (less than significant with mitigation)

Impacts from construction, operation, and maintenance of the Patterson Pass Project would be similar to those described for the program. The majority of construction activities would take place on potential upland grassland dispersal and aestivation habitat for California tiger salamander, western spadefoot, and California red-legged frog. Aquatic habitats for specials-status amphibians would generally be avoided; however, direct impacts on habitat and impacts on water quality could result from road construction or widening activities. Estimated permanent and temporary impacts on seasonal wetland, mixed willow riparian forest, and ponds that may provide habitat for special-status amphibians are shown in Table 3.4-9. Impacts on drainages that may provide potential habitat for California red-legged frog and foothill yellow-legged frog could not be estimated because these features have not yet been delineated. These impacts would be significant because they could reduce the local population sizes of federally listed and sensitive amphibians through direct mortality or habitat loss. Implementation of Mitigation Measures BIO-1b, BIO-1e, Bio-3, BIO-5a through BIO-5c would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians

Mitigation Measure BIO-5b: Compensate for loss of habitat for special-status amphibians

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Impact BIO-6a-1: Potential disturbance or mortality of and loss of suitable habitat for western pond turtle—program Alternative 1: 417 MW (less than significant with mitigation)

Construction activities in the program area could result in direct effects on western pond turtle or its habitats (ponds, reservoirs, drainages, and surrounding riparian and grassland areas). Estimated permanent and temporary impacts on ponds, reservoirs, riparian, and grassland that may provide habitat for western pond turtle are shown in Table 3.4-7. Impacts on drainages that may provide potential habitat for western pond turtle could not be estimated because these features have not yet been delineated. Because the majority of construction activities would take place on grassland habitat along ridgelines, suitable aquatic habitat would generally be avoided; however, direct impacts on habitat and impacts on water quality could result from road construction or widening activities.

Aquatic and upland (overwintering, nesting) habitat for western pond turtle may be removed or temporarily disturbed by construction activities. Potential direct impacts include mortality or injury by equipment, entrapment in open trenches or other project facilities, and removal or disturbance of aquatic or upland nesting habitat. Western pond turtles could also be injured or killed if gasoline, oil, or other contaminants enter habitat. Declines in populations of western pond turtle throughout the species' range have been documented (Jennings and Hayes 1994). Loss of individuals in the program area could diminish the local population and lower reproductive potential, contributing to the further decline of the species. The loss of upland nesting sites or eggs would also decrease the local population. This impact would be significant, but implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, and BIO-6 would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

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

If it is determined through preconstruction surveys conducted pursuant to Mitigation Measure BIO-3a that suitable aquatic or upland habitat for western pond turtle is present within proposed work areas, the following measures, consistent with measures developed for the EACCS, will be implemented to ensure that the proposed project does not have a significant impact on western pond turtle.

- One week before and within 24 hours of beginning work in suitable aquatic habitat, a qualified biologist (one who is familiar with different species of turtles) will conduct surveys for western 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 period for each 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 will 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-6a-2: Potential disturbance or mortality of and loss of suitable habitat for western pond turtle—program Alternative 2: 450 MW (less than significant with mitigation)

Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Construction activities in the program area could result in direct effects on western pond turtle or its habitats (ponds, reservoirs, drainages, and surrounding riparian and grassland areas). Estimated permanent and temporary impacts on ponds, reservoirs, riparian, and grassland that may provide habitat for western pond turtle are shown in Table 3.4-7. Impacts on drainages that may provide potential habitat for western pond turtle could not be estimated because these features have not yet been delineated. Because the majority of construction activities would take place on grassland habitat along ridgelines, suitable aquatic habitat would generally be avoided; however, direct impacts on habitat and impacts on water quality could result from road construction or widening activities.

Aquatic and upland (overwintering, nesting) habitat for western pond turtle may be removed or temporarily disturbed by construction activities. Potential direct impacts include mortality or injury by equipment, entrapment in open trenches or other project facilities, and removal or disturbance of aquatic or upland nesting habitat. Western pond turtles could also be injured or killed if gasoline, oil, or other contaminants enter habitat. Declines in populations of western pond turtle throughout the species' range have been documented (Jennings and Hayes 1994). Loss of individuals in the program area could diminish the local population and lower reproductive potential, contributing to the further decline of the species. The loss of upland nesting sites or eggs would also decrease the local population. This impact would be significant, but implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, and BIO-6 would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

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

Impact BIO-6b: Potential disturbance or mortality of and loss of suitable habitat for western pond turtle—Golden Hills Project (less than significant with mitigation)

Impacts from construction, operation, and maintenance of the Golden Hills Project would be similar to those described for the program. Estimated permanent and temporary impacts on ponds, mixed willow riparian scrub, and grassland that may provide habitat for western pond turtle are shown in Table 3.4-8. Impacts on drainages that may provide potential habitat for western pond turtle could not be estimated because these features have not yet been delineated. Because the majority of construction activities would take place on grassland habitat along ridgelines, suitable aquatic habitat would generally be avoided; however, direct impacts on habitat and impacts on water quality could result from road construction or widening activities.

Aquatic and upland (overwintering, nesting) habitat for western pond turtle may be removed or temporarily disturbed by construction activities. Potential direct impacts include mortality or injury by equipment, entrapment in open trenches or other project facilities, and removal or disturbance of aquatic or upland nesting habitat. Western pond turtles could also be injured or killed if gasoline, oil, or other contaminants enter habitat. Declines in populations of western pond turtle 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, contributing to the further decline of the species. The loss of upland nesting sites or eggs would also decrease the local population. This impact would be significant, but implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, and BIO-6 would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

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

Impact BIO-6c: Potential disturbance or mortality of and loss of suitable habitat for western pond turtle—Patterson Pass Project (less than significant with mitigation)

Impacts from construction, operation, and maintenance of the Patterson Pass Project would be similar to those described for the program. Estimated permanent and temporary impacts on ponds, mixed willow riparian scrub, and grassland that may provide habitat for western pond turtle are shown in Table 3.4-9. Impacts on drainages that may provide potential habitat for western pond turtle could not be estimated because these features have not yet been delineated. Because the majority of construction activities would take place on grassland habitat along ridgelines, suitable aquatic habitat would generally be avoided; however, direct impacts on habitat and impacts on water quality could result from road construction or widening activities.

Aquatic and upland (overwintering, nesting) habitat for western pond turtle may be removed or temporarily disturbed by construction activities. Potential direct impacts include mortality or injury by equipment, entrapment in open trenches or other project facilities, and removal or disturbance of aquatic or upland nesting habitat. Western pond turtles could also be injured or killed if gasoline, oil, or other contaminants enter habitat. Declines in populations of western pond turtle 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, contributing to the further decline of the species. The loss of upland nesting sites or eggs would also decrease the local population. This impact would be significant, but implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, and BIO-6 would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

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

Impact BIO-7a-1: Potential disturbance or mortality of and loss of suitable habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip—program Alternative 1: 417 MW (less than significant with mitigation)

Construction activities in the program area could result in direct effects on Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip or their habitats (grassland, chaparral, oak woodland, and scrub). Estimated permanent and temporary impacts on grassland, chaparral, oak woodland, and scrub that may provide habitat for these species are shown in Table 3.4-7. It is anticipated that the majority of construction activities would take place on grassland habitat along ridgelines and that loss of chaparral, oak woodland, and scrub habitat would be minimal. Potential direct impacts include mortality or injury by equipment, entrapment in open trenches or other project facilities, and removal or disturbance of habitat. Operation and maintenance 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 state- and federally listed as threatened because of habitat loss and fragmentation resulting from 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 cropland and urban development (Jennings and Hayes 1994:164). Loss of individuals in the program area could diminish the local populations of these species and lower reproductive potential, contributing to the further decline of these species. This would be a significant impact; however, implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-5c, BIO-7a, and BIO-7b would reduce this impact to a less-than-significant level by reducing the potential for injury and mortality of individuals, restoring disturbed habitat, and compensating for permanent habitat loss.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles

Where suitable habitat for Blainville's horned lizard, Alameda whipsnake, or San Joaquin coachwhip is identified in proposed work areas, all project proponents will ensure that BMPs and other appropriate measures, in accordance with measures developed for the EACCS, be incorporated into the appropriate design and construction documents. *Implementation of some of these measures will require that the project proponent obtain incidental take permits from USFWS and CDFW (Alameda whipsnake) before construction begins.* 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 (e.g., equipment staging, vegetation removal, grading) associated with the program. If any Blainville's horned lizards, Alameda whipsnakes, or San Joaquin coachwhips 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 will be used for erosion control.
- Where applicable, barrier fencing 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 onsite biological monitor will inspect open trenches and pits and under construction equipment and materials left onsite for special-status reptiles each morning and evening during construction.
- Ground disturbance in suitable habitat will be minimized.
- Vegetation within the proposed work area will be removed prior to grading. Prior to clearing and grubbing operations, a qualified biologist will clearly mark vegetation within the work area that will be avoided. Vegetation outside the work area will not be removed. Where possible hand tools (e.g., trimmer, chain saw) will be used to trim or remove vegetation. 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 qualified biologist who is USFWS- and/or CDFW-approved

under an incidental take permit for the specific project will trap and move the animal(s) to a USFWS and/or CDFW-approved relocation area. 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.

Mitigation Measure BIO-7b: Compensate for loss of habitat for special-status reptiles

Where impacts on habitat for special-status reptiles cannot be avoided or minimized, compensatory mitigation will be undertaken in accordance with mitigation ratios and requirements developed under the EACCS (Appendix C). In the event that incidental take permits are required for Alameda whipsnake, compensatory mitigation will be undertaken in accordance with the terms of permits in consultation with USFWS and CDFW.

Impact BIO-7a-2: Potential disturbance or mortality of and loss of suitable habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip—program Alternative 2: 450 MW (less than significant with mitigation)

Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Construction activities in the program area could result in direct effects on Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip or their habitats (grassland, chaparral, oak woodland, and scrub). Estimated permanent and temporary impacts on grassland, chaparral, oak woodland, and scrub that may provide habitat for these species are shown in Table 3.4-7. It is anticipated that the majority of construction activities would take place on grassland habitat along ridgelines and that loss of chaparral, oak woodland, and scrub habitat would be minimal. Potential direct impacts include mortality or injury by equipment, entrapment in open trenches or other project facilities, and removal or disturbance of habitat. Operation and maintenance 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 state- and federally listed as threatened because of habitat loss and fragmentation resulting from 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 cropland and urban development (Jennings and Hayes 1994:164). Loss of individuals in the program area could diminish the local populations of these species and lower reproductive potential, contributing to the further decline of these species. This would be a significant impact; however, implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-5c, BIO-7a, and BIO-7b would reduce this impact to a less-than-significant level by reducing the potential for injury and mortality of individuals, restoring disturbed habitat, and compensating for permanent habitat loss.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles

Mitigation Measure BIO-7b: Compensate for loss of habitat for special-status reptiles

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

Impacts from construction, operation, and maintenance of the Golden Hills Project would be similar to those described for the program. Estimated permanent and temporary impacts on grassland, chaparral, oak woodland, and scrub that may provide habitat for Blainville's horned lizard, Alameda whipsnake, or San Joaquin coachwhip are shown in Table 3.4-8. It is anticipated that the majority of construction activities would take place on grassland habitat along ridgelines and that loss of chaparral, oak woodland, and scrub habitat would be minimal. Potential direct impacts include mortality or injury by equipment, entrapment in open trenches or other project facilities, and removal or disturbance of habitat. Operation and maintenance activities, such as road and firebreak maintenance, may also result in injury or mortality of individuals. Loss of individuals in the project area could diminish the local populations of these species and lower reproductive potential, contributing to the further decline of these species. This would be a significant impact, but implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-5c, BIO-7a, and BIO-7b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles

Mitigation Measure BIO-7b: Compensate for loss of habitat for special-status reptiles

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

Impacts from construction, operation, and maintenance of the Patterson Pass Project would be similar to those described for the program. Estimated permanent and temporary impacts on grassland and mixed willow riparian scrub that may provide habitat for Blainville's horned lizard, Alameda whipsnake, or San Joaquin coachwhip are shown in Table 3.4-9. It is anticipated that the majority of construction activities would take place on grassland habitat along ridgelines and that loss of mixed willow riparian scrub habitat would be minimal. Potential direct impacts include mortality or injury by equipment, entrapment in open trenches or other project facilities, and removal or disturbance of habitat. Operation and maintenance activities, such as road and firebreak maintenance, may also result in injury or mortality of individuals. Loss of individuals in the project area could diminish the local populations of these species and lower reproductive potential, contributing to the further decline of these species. This would be a significant impact; however, implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-5c, BIO-7a, and BIO-7b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles

Mitigation Measure BIO-7b: Compensate for loss of habitat for special-status reptiles

Impact BIO-8a-1: Potential construction-related disturbance or mortality of special-status and non–special-status migratory birds—program Alternative 1: 417 MW (less than significant with mitigation)

Construction activities during the nesting season (generally February 1–August 31) of white-tailed kite, bald eagle, northern harrier, Swainson's hawk, golden eagle, western burrowing owl, loggerhead shrike, and tricolored blackbird could result in direct effects on these species, as well as on non–special-status migratory birds, if they are nesting in the program area. Suitable nesting habitat may be present in nearly all land cover types in the program area. Removal of grassland, burrows, wetland and marsh vegetation, and trees or shrubs with active nests and construction disturbance during the breeding season may result in nest abandonment and subsequent loss of eggs or young. Because the placement of wind turbines would generally be on the tops of hills and ridgelines in the program area where trees are not generally present, the number of trees to be removed is expected to be very low. Exclusion of burrowing owls from their burrows during the non-nesting season as part of efforts to avoid or minimize some forms of direct take could result in harm of burrowing owls. Estimated permanent and temporary impacts on suitable foraging habitat (grassland, cropland, alkali meadow and scald, and wetlands) for special-status and non–special-status birds are shown in Table 3.4-7. Such losses could affect the local population of special-status and non–special-status birds. This would be a significant impact. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-5c, BIO-8a, and BIO-8b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

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

Where suitable habitat is present for raptors within 1 mile (within 2 miles for golden eagles) and for tree/shrub- and ground-nesting migratory birds (non-raptors) within 50 feet of proposed work areas, the following measures will be implemented to ensure that the proposed project does not have a significant impact on nesting special-status and non–special-status birds.

- Remove suitable nesting habitat (shrubs and trees) during the non-breeding season (typically September 1–January 31) for nesting birds.
- To the extent feasible, avoid construction activities in or near suitable or occupied nesting habitat during the breeding season of birds (generally February 1–August 31).
- 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 1-mile buffer will be surveyed for tree-nesting raptors (except for golden eagles), and a 50-foot buffer will be surveyed for all other bird species.
- Surveys to locate eagle nests within 2 miles of construction will be conducted during the breeding season prior to construction. A 1-mile no-disturbance buffer will be implemented for construction activities to protect nesting eagles from disturbance. Through coordination with USFWS, the no-disturbance buffer may be reduced to 0.5 mile if construction activities are not within line-of-sight of the nest.
- If an active nest (other than golden eagle) is identified near a proposed work area and work cannot be conducted outside the nesting season (February 1–August 31), a no-activity zone will be established around the nest by a qualified biologist in coordination with USFWS and/or CDFW. Fencing and/or flagging will be used to delineate the no-activity zone. To minimize the potential to affect the reproductive success of the nesting pair, the extent of the no-activity zone will be based on the distance of the activity to the nest, the type and extent of the proposed activity, the duration and timing of the activity, the sensitivity and habituation of the species, and the dissimilarity of the proposed activity to background activities. The no-activity zone will be large enough to avoid nest abandonment and will be between 50 feet and 1 mile 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 for western burrowing owl is in or within 500 feet of proposed work areas, the following measures will be implemented to avoid or minimize potential adverse impacts on burrowing owls.

- To the maximum extent feasible (e.g., 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).
- 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.
- If an active burrow is identified near a proposed work area and work cannot be conducted outside the nesting season (February 1–August 31), a no-activity zone will be established by a qualified biologist 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–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) and/or other measure that still minimizes disturbance of the owls (while allowing reproductive success during the breeding season). The site-specific buffer (and/or other measure) 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 in the direct disturbance area and cannot be avoided during the non-breeding season (generally September 1 through January 31), burrowing owls may be excluded from burrows through the installation of one-way doors at burrow entrances. A burrowing owl exclusion plan, prepared by the project proponent, must be approved by CDFW prior to exclusion of owls. One-way doors (e.g., modified dryer vents or other CDFW-approved method) will be left in place for a minimum of 1 week and monitored daily to ensure that the owl(s) have left the burrow(s). Excavation of the burrow will be conducted using hand tools. During excavation of the burrow, a section of flexible plastic pipe (at least 3 inches in diameter) will be inserted into the burrow tunnel to maintain an escape route for any animals that may be inside the burrow. Owls will be excluded from their burrows as a last resort and only if other avoidance and minimization measures cannot be implemented.
- Avoid destruction of unoccupied burrows outside the work area and place visible markers near burrows to ensure that they are not collapsed.
- Conduct ongoing surveillance of the project site for burrowing owls during project activities. If additional owls are observed using burrows within 500 feet of construction, the onsite biological monitor will determine, in coordination with CDFW, if the owl(s) are or would be affected by construction activities and if additional exclusion zones are required.

Impact BIO-8a-2: Potential construction-related disturbance or mortality of special-status and non–special-status migratory birds—program Alternative 2: 450 MW (less than significant with mitigation)

Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Construction activities during the nesting season (generally February 1–August 31) of white-tailed kite, bald eagle, northern harrier, Swainson's hawk, golden eagle, western burrowing owl, loggerhead shrike, and tricolored blackbird could result in direct effects on these species, as well as on non–special-status migratory birds, if they are nesting in the program area. Suitable nesting habitat may be present in nearly all land cover types in the program area. Removal of grassland, burrows, wetland and marsh vegetation, and trees or shrubs with active nests and construction disturbance during the breeding season may result in nest abandonment and subsequent loss of eggs or young. Because the placement of wind turbines would generally be on the tops of hills and ridgelines in the program area where trees are not generally present, the number of trees to be removed is expected to be very low. Exclusion of burrowing owls from their burrows during the non-nesting season as part of efforts to avoid or minimize some forms of direct take could result in harm of burrowing owls. Estimated permanent and temporary impacts on suitable foraging habitat (grassland, cropland, alkali meadow and scald, and wetlands) for special-status and non–special-status birds are shown in Table 3.4-7. Such losses could affect the local population of special-status and non–special-status birds. This would be a significant impact. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-5c, BIO-8a, and BIO-8b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

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

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

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

Construction activities during the nesting season (generally February 1–August 31) of white-tailed kite, bald eagle, northern harrier, Swainson's hawk, golden eagle, western burrowing owl, loggerhead shrike, and tricolored blackbird could result in direct effects on these species, as well as on non–special-status migratory birds, if they are nesting in the project area. Suitable nesting habitat may be present in nearly all land cover types in the project area. Removal of grassland, burrows, wetland and marsh vegetation, and trees or shrubs with active nests and construction disturbance during the breeding season may result in nest abandonment and subsequent loss of eggs or young. Because the placement of wind turbines would generally be on the tops of hills and ridgelines in the program area where trees are not generally present, the number of trees to be removed is expected to be very low. Exclusion of burrowing owls from their burrows during the non-nesting season as part of efforts to avoid or minimize some forms of direct take could result in harm of burrowing owls. Estimated permanent and temporary impacts on suitable foraging habitat (grassland, cropland, alkali meadow and scald, and wetlands) for special-status and non–special-status birds are shown in Table 3.4-8. Such losses could affect the local population of special-status and non–special-status birds. This would be a significant impact. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-5c, BIO-8a, and BIO-8b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

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

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

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

Construction activities during the nesting season (generally February 1–August 31) of white-tailed kite, northern harrier, Swainson's hawk, golden eagle, western burrowing owl, loggerhead shrike, and tricolored blackbird could result in direct effects on these species, as well as on non–special-status migratory birds, if they are nesting in the project area. Suitable nesting habitat may be present in nearly all land cover types in the project area. Removal of grassland, burrows, wetland vegetation, and trees or shrubs with active nests and construction disturbance during the breeding season may result in nest abandonment and subsequent loss of eggs or young. Because the placement of wind turbines would generally be on the tops of hills and ridgelines in the program area where trees are not generally present, the number of trees to be removed is expected to be very low. Exclusion of burrowing owls from their burrows during the non-nesting season as part of efforts to avoid or minimize some forms of direct take could result in harm of burrowing owls. Estimated permanent and temporary impacts on suitable foraging habitat (grassland, mixed willow riparian scrub, and wetlands) for special-status and non–special-status birds are shown in Table 3.4-9. Such losses could affect the local population of special-status and non–special-status birds. This would be a significant impact. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-5c, BIO-8a, and BIO-8b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

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

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

Impact BIO-9a-1: Permanent and temporary loss of occupied habitat for western burrowing owl and foraging habitat for tricolored blackbird and other special-status and non–special-status birds—program Alternative 1: 417 MW (less than significant with mitigation)

Implementation of the program would result in the temporary and permanent loss of grassland that provides suitable foraging habitat for burrowing owl and a number of other special-status and non–special-status migratory birds. Because of the limited use of the program area by Swainson's hawks for foraging, no compensation is proposed for the loss of foraging habitat for Swainson's hawk. Estimated permanent and temporary impacts on suitable grassland foraging habitat for burrowing owl, tricolored blackbird, and other special-status and non–special-status birds are shown in Table 3.4-7. The loss of grassland foraging habitat for special-status and non–special-status birds would be compensated through implementation of Mitigation Measure BIO-5b (for special-status amphibians) and/or through the standardized mitigation ratios for nonlisted species developed for the EACCS (Appendix C).

CDFW has determined that compensation is required for permanent loss of occupied burrowing owl habitat (i.e., where burrowing owls have been documented to occupy burrows in the preceding 3 years). Permanent loss of occupied burrowing owl habitat could affect the local population and would be a significant impact; however, implementation of Mitigation Measures BIO-5b, BIO-5c, and BIO-9 would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-5b: Compensate for loss of habitat for special-status amphibians

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Mitigation Measure BIO-9: Compensate for the permanent loss of occupied habitat for western burrowing owl

If construction activities would 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 permanently protecting mitigation land through a conservation easement or by implementing alternative mitigation determined through consultation with CDFW as described in its *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012:11–13). The project proponent will work with CDFW to develop the compensation plan, which will be subject to County review and approval.

Impact BIO-9a-2: Permanent and temporary loss of occupied habitat for western burrowing owl and foraging habitat for tricolored blackbird and other special-status and non–special-status birds—program Alternative 2: 450 MW (less than significant with mitigation)

Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Implementation of the program would result in the temporary and permanent loss of grassland that provides suitable foraging habitat for burrowing owl and a number of other special-status and non–special-status migratory birds. Because of the limited use of the program area by Swainson's hawks for foraging, no compensation is proposed for the loss of foraging habitat for Swainson's hawk. Estimated permanent and temporary impacts on suitable grassland foraging habitat for burrowing owl, tricolored blackbird, and other special-status and non–special-status birds are shown in Table 3.4-7. The loss of grassland foraging habitat for special-status and non–special-status birds would be compensated through implementation of Mitigation Measure BIO-5b (for special-status amphibians) and/or through the standardized mitigation ratios for nonlisted species developed for the EACCS (Appendix C).

CDFW has determined that compensation is required for permanent loss of occupied burrowing owl habitat (i.e., where burrowing owls have been documented to occupy burrows in the preceding 3 years). Permanent loss of occupied burrowing owl habitat could affect the local population and would be a significant impact; however, implementation of Mitigation Measures BIO-5b, BIO-5c, and BIO-9 would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-5b: Compensate for loss of habitat for special-status amphibians

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Mitigation Measure BIO-9: Compensate for the permanent loss of occupied habitat for western burrowing owl

Impact BIO-9b: Permanent and temporary loss of occupied habitat for western burrowing owl and foraging habitat for tricolored blackbird and other special-status and non–special-status birds—Golden Hills Project (less than significant with mitigation)

Construction of the Golden Hills Project would result in the temporary and permanent loss of grassland that provides suitable foraging habitat for burrowing owl, tricolored blackbird, and a number of other special-status and non–special-status migratory birds. Estimated permanent and temporary impacts on suitable grassland foraging habitat for burrowing owl, tricolored blackbird, and other special-status and non–special-status birds are shown in Table 3.4-8. The loss of grassland foraging habitat for special-status and non–special-status birds would be compensated through implementation of Mitigation Measure 5b (for special-status amphibians) and/or through the standardized mitigation ratios for non-listed species developed for the EACCS (Appendix C).

CDFW has determined that compensation is required for permanent loss of occupied burrowing owl habitat (i.e., where burrowing owls have been documented to occupy burrows in the preceding 3 years). Permanent loss of occupied habitat could affect the local population and would be a significant impact; however, implementation of Mitigation Measures BIO-5b, BIO-5c, and BIO-9 would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-5b: Compensate for loss of habitat for special-status amphibians

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Mitigation Measure BIO-9: Compensate for the permanent loss of occupied habitat for western burrowing owl

Impact BIO-9c: Permanent and temporary loss of occupied habitat for western burrowing owl and foraging habitat for tricolored blackbird and other special-status and non-special-status birds—Patterson Pass Project (less than significant with mitigation)

Construction of the Patterson Pass Project would result in the temporary and permanent loss of grassland that provides suitable foraging habitat for burrowing owl, tricolored blackbird, and a number of other special-status and non–special-status migratory birds. Estimated permanent and temporary impacts on suitable grassland foraging habitat for burrowing owl, tricolored blackbird, and other special-status and non–special-status birds are shown in Table 3.4-9. The loss of grassland foraging habitat for special-status and non–special-status birds would be compensated through implementation of Mitigation Measure 5b (for special-status amphibians) and/or through the standardized mitigation ratios for non-listed species developed for the EACCS (Appendix C).

CDFW has determined that compensation is required for permanent loss of occupied burrowing owl habitat (i.e., where burrowing owls have been documented to occupy burrows in the preceding 3 years). Permanent loss of occupied habitat could affect the local population and would be a significant impact; however, implementation of Mitigation Measures BIO-5c and BIO-9 would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-5b: Compensate for loss of habitat for special-status amphibians

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Mitigation Measure BIO-9: Compensate for the permanent loss of occupied habitat for western burrowing owl

Impact BIO-10a-1: Potential injury or mortality of and loss of habitat for San Joaquin kit fox and American badger—program Alternative 1: 417 MW (less than significant with mitigation)

Construction activities in the program area could result in direct effects on San Joaquin kit fox and American badger or their grassland habitat. Estimated permanent and temporary impacts on grassland that provide suitable denning and foraging habitat for San Joaquin kit fox and American badger are shown in Table 3.4-7. In addition to the permanent and temporary removal of habitat, other potential direct impacts 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 disturbance 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. Operation and maintenance activities, such as road and firebreak maintenance, may also result in injury or mortality of individuals. San Joaquin kit fox is federally listed as endangered and state-listed as threatened because of habitat loss resulting from 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 program area could diminish the local populations of these species and reduce reproductive potential, contributing to the further decline of these species. This would be a significant impact; however, implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-5c, BIO-10a, and BIO-10b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

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

Where suitable habitat is present for San Joaquin fit fox and American badger in and adjacent to proposed work areas, the following measures, consistent with measures developed in the EACCS, will be implemented to ensure that proposed projects do not have a significant impact on San Joaquin kit fox or American badger. *Implementation of some of these measures will require that the project proponent obtain incidental take permits from USFWS and CDFW (San Joaquin kit fox) before construction begins.* Implementation of state and federal requirements contained in such authorization may constitute compliance with corresponding measures in this PEIR..

- To the maximum extent feasible, suitable dens for San Joaquin kit fox and American badger will be avoided.
- All project proponents 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). Resumes of biologists will be submitted to USFWS for review and approval prior to the start of the survey.
- Preconstruction surveys for American badgers will be conducted in conjunction with San Joaquin kit fox preconstruction surveys.
- As described in U.S. Fish and Wildlife Service 2011, the preconstruction survey will be conducted no less than 14 days and no more than 30 days before the beginning of ground disturbance, or any activity likely to affect San Joaquin kit fox. The biologists will conduct den searches by systematically walking transects through the project area and a buffer area to be determined in coordination with USFWS and CDFW. Transect distance should be based

on the height of vegetation such that 100% visual coverage of the project area is achieved. If a potential or known den is found during the survey, the biologist will measure the size of the den, evaluate the shape of the den entrances, and note tracks, scat, prey remains, and recent excavations at the den site. 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, ground squirrel) that otherwise has appropriate characteristics for kit fox use; or an artificial structure that otherwise has appropriate characteristics for kit fox use.
- Known den: Any existing natural den or artificial 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 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 artificial 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 USFWS within 5 days following completion of the survey and prior to the start of ground disturbance or construction activities.

- After preconstruction den searches and before the commencement of repowering activities, exclusion zones will be established as measured in a radius outward from the entrance or cluster of entrances of each den. Repowering activities will be prohibited or greatly restricted within these exclusion zones. 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 using the following parameters.

 - 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 in 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 infrared 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: If incidental take permits have been received (from USFWS and CDFW), potential dens can be removed (preferably by hand excavation) by biologist or under the supervision of a biologist without monitoring, unless other restrictions were issued with the incidental take permits. If no take authorizations have been issued, the potential dens will be monitored as if they are known dens. If any den was considered a potential den but was later determined during monitoring or destruction to be currently or previously used by kit foxes (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 vehicular speed limit will be reduced to 10 miles per hour during nighttime work.
- 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.

- A representative appointed by the project proponent will be the contact for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured, or entrapped kit fox. The representative will be identified during environmental sensitivity training (Mitigation Measure BIO-1b) and his/her name and phone number will be provided to USFWS and CDFW. Upon such incident or finding, the representative will immediately contact USFWS and CDFW.
- The Sacramento USFWS office and CDFW will be notified in writing within 3 working days of the accidental death or injury of a San Joaquin kit fox during project-related activities. Notification must include the date, time, and location of the incident, and any other pertinent information.

Mitigation Measure BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger

Where permanent impacts on habitat for San Joaquin kit fox and American badger cannot be avoided or minimized, compensatory mitigation will be undertaken in accordance with mitigation ratios and requirements developed under the EACCS (Appendix C). In the event that incidental take permits are required for San Joaquin kit fox, compensatory mitigation will be undertaken in accordance with the terms of permits in consultation with USFWS and CDFW.

Impact BIO-10a-2: Potential injury or mortality of and loss of habitat for San Joaquin kit fox and American badger—program Alternative 2: 450 MW (less than significant with mitigation)

Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Construction activities in the program area could result in direct effects on San Joaquin kit fox and American badger or their grassland habitat. Estimated permanent and temporary impacts on grassland that provide suitable denning and foraging habitat for San Joaquin kit fox and American badger are shown in Table 3.4-7. In addition to the permanent and temporary removal of habitat, other potential direct impacts 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 disturbance 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. Operation and maintenance activities, such as road and firebreak maintenance, may also result in injury or mortality of individuals. San Joaquin kit fox is federally listed as endangered and state-listed as threatened because of habitat loss resulting from 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 program area could diminish the local populations of these species and reduce reproductive potential, contributing to the further decline of these species. This would be a significant impact; however, implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-5c, BIO-10a, and BIO-10b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

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

Mitigation Measure BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger

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

Impacts from construction, operation, and maintenance of the Golden Hills Project would be similar to those described for the program. Estimated permanent and temporary impacts on grassland that provide suitable denning and foraging habitat for San Joaquin kit fox and American badger are shown in Table 3.4-8. In addition to the permanent and temporary removal of habitat, other direct impacts 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 disturbance 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. Operation and maintenance activities, such as road and firebreak maintenance, may also result in injury or mortality of individuals. Loss of individuals in the project area could diminish the local populations and/or lower the reproductive potential of San Joaquin kit fox and American badger, contributing to the further decline of these species. This would be a significant impact; however, implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-5c, BIO-10a, and BIO-10b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

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

Mitigation Measure BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger

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

Impacts from construction, operation, and maintenance of the Patterson Pass Project would be similar to those described for the program. Estimated permanent and temporary impacts on grassland that provide suitable denning and foraging habitat for San Joaquin kit fox and American badger are shown in Table 3.4-9. In addition to the permanent and temporary removal of habitat, other direct impacts 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 disturbance 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. Operation and maintenance activities, such as road and firebreak maintenance, may also result in injury or mortality of individuals. Loss of individuals in the project area could diminish the local populations and/or lower the reproductive potential of San Joaquin kit fox and American badger, contributing to the further decline of these species. This would be a significant impact; however, implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-5c, BIO-10a, and BIO-10b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

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

Mitigation Measure BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger

Impact BIO-11a-1: Avian mortality resulting from interaction with wind energy facilities—program Alternative 1: 417 MW (significant and unavoidable)

The operation of wind energy facilities has been shown to cause avian fatalities through collisions with wind turbines and powerlines and through electrocution on powerlines.

Most collection lines for first- and second- generation turbines are aboveground facilities. As repowering projects are implemented, old collection systems would be removed and new collection systems would be installed. The majority of new collection lines associated with the program would be undergrounded, reducing the risk of avian fatality from electrocution or collision with powerlines.

Diablo Winds, Buena Vista, and Vasco Winds are the only repowered projects in the APWRA for which estimates of avian fatality rates are available. Based on these estimates, avian collision risk is expected to be substantially reduced when older-generation turbines are replaced by newer, larger turbines with the same total rated nameplate capacity (Table 3.4-10). However, while the available evidence suggests that repowering could substantially reduce turbine-related avian fatalities below the levels documented for older generation turbines, avian fatalities would continue to occur. Moreover, while repowering is intended to reduce fatalities, enough uncertainty remains in light of project- and site-specific data to warrant a conservative approach in the impact analysis. Accordingly, the continued or increased loss of birds (including special-status species) at a rate exceeding the baseline rate would be a significant adverse impact. There is also evidence that the repowering program would result in continued avian mortality in conflict with specific laws and regulations (e.g., ESA, CESA, MBTA) that are not based on mortality rates, as described above in *Determination of Significance*, and with the objectives of the 2007 Settlement Agreement that bound the wind energy operators and the County to provide strategies and measures to conserve avian species of concern and their habitats. This conflict is considered a significant impact on protected and special-status avian species, and adopting a conservative expectation that some level of avian mortality will continue even with the implementation of every feasible mitigation measure and conservation strategy, this would be a significant and unavoidable impact.

It should be noted that turbines used in future repowering projects are likely to be of similar size to the Vasco Winds turbines but much larger than the Diablo Winds and Buena Vista turbines in both overall size and rated nameplate capacity. There is evidence to suggest that larger turbines—like those used in the Vasco Winds project—could result in additional decreases in avian fatality rates for bird species currently killed in the APWRA (Smallwood and Karas 2009). However, it is also possible that larger turbines may negatively affect a different suite of bird species that have been relatively unaffected by older (i.e., smaller) turbines. In addition, fatality rates in the APWRA are highly variable (that is, because they differ across years, turbines types, geographies, and topographies, species impacts may differ between sites due to different levels of use) and potentially imprecise (Smallwood et al 2010.; ICF International 2013). Nonetheless, these three repowering projects represent the best available information to understand the potential for avian fatalities associated with repowering; accordingly, data from these projects were used to form the basis for avian fatality estimates. The estimated changes associated with Alternative 1 are shown in Table 3.4-11 and discussed below. Postconstruction monitoring, once the turbines are in operation, will provide data to quantify the actual extent of change in avian fatalities from repowering and the extent of avian fatality for projects in the program area, and will contribute to the body of knowledge supporting future analyses.

Table 3.4-11. Estimated Annual Avian Fatalities for Existing and Repowered Program Area—Alternative 1 (417 MW)

	Estimated Annual Fatalities for Program Area						
	Nonrepowered	Repowered					
		Diablo Winds[a]		Buena Vista[b]		Vasco Winds[c,d]	
Species	Average Annual Fatalities	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease
American kestrel	194.2	37.5	81	62.6	75	123.8	36
Barn owl	79.5	8.3	90	0.0	100	13.8	83
Burrowing owl	255.1	350.3	-37	0.0	100	20.9	92
Golden eagle	26.6	4.2	84	16.7	44	13.3	50
Loggerhead shrike	61.8	0.0	100	0.0	100	0.0	100
Prairie falcon	6.6	0.0	100	0.0	100	0.0	100
Red-tailed hawk	144.5	83.4	42	41.7	71	102.6	29
Swainson's hawk	0.5	0.0	100	0.0	100	0.0	100
All raptors	799.9	504.6	37	129.3	84	267.7	67
All native non-raptors	1,482.0	1,046.7	29	421.2	81	873.2	41

Note: fatality rates reflect annual fatalities (95% confidence interval).

[a] Diablo Winds fatality rates extrapolated to the overall program area.

[b] Buena Vista fatality rates extrapolated to the overall program area.

[c] Vasco Winds fatality rates extrapolated to the overall program area.

[d] Vasco Winds fatality rate for golden eagle based on updated information received from NextEra Energy Resources on July 21, 2014, and extrapolated to the overall program area.

American Kestrel. As shown in Table 3.4-11, a fully repowered 417 MW program area would be expected to result in an estimated 38–124 American kestrel fatalities per year. Based on these estimates, the program could decrease average annual fatalities by 36–81%.

The North American population of American kestrels is estimated at more than 4,000,000 birds, representing 75% of the global population. Populations have declined over the western U.S. since the 1980s, pronouncedly so since the 1990s (Hawk Mountain 2007). This trend is also apparent for California's foothill and Central Valley populations (Sauer et al. 2008). North American Breeding Bird Survey (BBS) data indicate a decline in American kestrels for Coastal California and the state as a whole (Sauer et al. 2011), as do Christmas Bird Count data for California (National Audubon Society 2011).

Based on the estimated annual fatalities in Table 3.4.11, adverse effects on American kestrel from wind turbines would substantially decrease with repowering in the program area. In addition, Mitigation Measures BIO-11c and BIO-11f will further limit prey availability and reduce the number of potential perch sites in the program area, potentially reducing the exposure of American kestrels to turbine hazards. Furthermore, the rotor-swept area of repowered turbines would be higher off the ground than that of existing turbines, potentially reducing the risk to kestrels, as they are generally perch and pounce predators, perching lower in higher wind speeds (Smallwood and Bird 2002). Considering that American kestrel fatalities are likely to substantially decline with repowering (Smallwood et al. 2009; Smallwood 2010; ICF International 2012), repowering the program area is unlikely to have adverse impacts on American kestrels at the population level.

Barn Owl. As shown in Table 3.4-11, a fully repowered 417 MW program area would be expected to result in an estimated 8–14 barn owl fatalities per year. Based on these estimates, the program could decrease average annual fatalities by 83–90%.

Barn owls are common in California with a stable population in the state (Audubon California 2010). Although BBS results may indicate a declining population in the state, the data are of limited creditability due to sampling deficiencies (Sauer et al. 2011). Barn owls are used throughout California for rodent control in orchards and vineyards (Barn Owl Box Company 2012). It is uncertain what the effect of repowering the program area would have on local barn owl populations. The higher rotor-swept area of repowered turbines may reduce the risk of turbine collision, as most hunting is done in low quartering flights at about 1.5–4.5 meters (5–15 feet) above the ground (Marti et al. 2005). Mitigation Measure BIO-11c would also reduce the perch availability in the program area. It is unclear what the effects of the estimated 8–14 turbine-related fatalities of barn owls per year would have on the local population, but the species' relative abundance in the state would indicate that fatalities as a result of repowering would be unlikely to have adverse impacts on the species at the population level.

Burrowing Owl. As shown in Table 3.4-11, a fully repowered 417 MW program area would be expected to result in an estimated 30–350 burrowing owl fatalities per year—a change ranging from a 92% decrease to a 37% increase in fatalities. This fatality estimate is based on data from Diablo Winds and Vasco Winds because no burrowing owl fatalities were detected at Buena Vista. Current evidence suggests that burrowing owl fatality rates are not reduced by the transition from old- to new-generation turbines to the same extent as the fatality rates of other species. The increase in energy production from 329 MW to 417 MW would likely result in a small estimated increase in burrowing owl fatalities per year.

Focused surveys in Contra Costa County in 2006 on 3.3 square miles and 2007 on 4.4 square miles in the APWRA found 56 pairs and 67 pairs, respectively (Barclay and Harman 2008 unpublished data), suggesting that the APWRA could support several hundred pairs of burrowing owls distributed in clusters. Smallwood et al.'s (2012) surveys in 2011 and 2012 estimated approximately 500–600 breeding pairs, ranging in density from 0 to approximately 28 breeding pairs per square kilometer. Since this species has been extirpated from much of the San Francisco Bay Area, it is believed that the APWRA may support the largest number of breeding pairs in the Bay Area (Barclay and Harman 2008 unpublished data). Studies of burrowing owls in the APWRA have suggested that turbine-related mortalities may lower adult and juvenile survivorship sufficiently such that the local population is not self-sustaining in some years (Smallwood et al. 2008), but recent surveys indicate that burrowing owl abundance in the APWRA may be much greater than previously estimated (Smallwood et al. 2012).A growing body of circumstantial evidence indicates that many of the burrowing owl fatalities found during fatality surveys are due to predation rather than turbine collision. Because of this confounding effect, the potential reduction in turbine-related burrowing owl fatalities may be underestimated because of the inability to distinguish fatalities resulting from predation from those caused by turbine collision (ICF International 2013).

Golden Eagle. As shown in Table 3.4-11, a fully repowered 417 MW program area would be expected to result in an estimated 4–17 golden eagle fatalities per year. Based on these estimates, the program could decrease average annual fatalities by 44–84%.

Portions of the Diablo Range in southern Alameda County and eastern Contra Costa County support some of the highest known densities of golden eagle nesting territories in the world (Hunt and Hunt

2006). In the past 15 years, several comprehensive studies, discussed below, estimated territory occupancy (number of breeding pairs); assessed reproductive rates; and monitored juvenile, subadult, and floater[2] range and mortality.

Hunt (2002) examined data collected data over a 7-year period between 1994 and 2002 that included the monitoring of 60–70 active territories within 30 km (11.6 miles) of the APWRA. In 2005, these territories were found to still be 100% occupied (Hunt and Hunt 2006). The conclusions of these studies were that the golden eagle population remains stable (Hunt 2002; Hunt and Hunt 2006). In addition, the studies found no increase in the number of actively breeding subadults, indicating that there are enough floaters to buffer any loss of breeding adults (Hunt 2002; Hunt and Hunt 2006). The conclusion of a stable golden eagle population in the APWRA vicinity is supported by the results of a population dynamics model that used reproduction rates and fatality rates, among other variables (Hunt 2002). However, the model results also suggested that the number of estimated annual fatalities used in the model, 50 individuals, could not be sustained by the number of breeding adults when considering the loss of reproductive potential incurred by each eagle fatality (Hunt and Hunt 2006). Although the vacant territories are filled by floaters and subadults to stabilize the APWRA population, because the population demands a flow of recruits from outside the area to fill breeding vacancies as they occur, the APWRA can be considered a population sink. The researchers conclude, therefore, that turbine-related mortality reduces the resilience of the local golden eagle population.

Table 3.4.11 shows an estimated 4–17 fatalities per year in a fully repowered program area, or between 8 and 36% of the 50 fatalities estimated for the Hunt (2002) model. It is not possible to determine the proportion of these fatalities that would consist of individuals from the local population. However, these annual fatality estimates, when compared to current conditions, would indicate that repowering the program area would reduce golden eagle fatalities and increase the potential for restoring a self-sustaining local breeding population. The implementation of mitigation measures described below—including Mitigation Measure BIO-11e, which would require that existing power lines associated with raptor strikes be retrofitted to be raptor-safe—would further reduce golden eagle fatalities in the program area.

Loggerhead Shrike. No documented fatalities of loggerhead shrikes have occurred at the Diablo Winds, Buena Vista, or Vasco Winds projects (Table 3.4-10), although loggerhead shrikes are regularly detected in the vicinity of the Diablo Winds turbines. The lack of documented fatalities may suggest a reduced level of fatality from the repowered turbines at these sites.

According to Shuford and Gardali (2008), loggerhead shrike was an abundant resident in the San Francisco Bay region in the early twentieth century. However, birds have been extirpated locally or reduced in numbers by habitat loss (Shuford and Gardali 2008). BBS data for California's shrike population show a negative trend from 1968 to 2010 (Sauer et al. 2011). Given the lack of documented fatalities at repowered facilities in the program area, it is difficult to quantify the effects of a fully repowered program area on the regional loggerhead shrike population. Minimizing available perches through Mitigation Measure BIO-11c and increasing the height of the rotor-swept area of repowered turbines may reduce the risk of turbine collisions for shrikes, as they mostly take prey on the ground (Yosef 1996). Careful monitoring of fatalities and implementing monitoring

[2] A juvenile is 3–15 months of age, a subadult is 1–3 years of age, and a floater is a nonbreeding, nonterritorial adult individual more than 4 years of age (Hunt 2002).

protocols that are likely to detect loggerhead shrike fatalities will be important for understanding impacts on this species and implementing adaptive management measures, as appropriate.

Prairie Falcon. Fatality estimates at repowered sites are not available for prairie falcon because no fatalities have been documented at Diablo Winds or Vasco Winds and only one fatality has been recorded at Buena Vista (Table 3.4-10). Consequently, it is difficult to estimate the annual fatalities that would result from a fully repowered program area. The lack of documented fatalities may suggest a reduced level of fatality from the repowered turbines at these sites. However, the nonrepowered fatality rate for prairie falcon is already relatively low (0.02 fatality/MW/year), suggesting that the collision risk for this species is low. Prairie falcons are present mostly in winter, and the baseline fatality rate is measured during a period when the seasonal shutdown has been in effect. Repowered turbines are not anticipated to shut down in winter.

Across North America, the prairie falcon population is stable but experiencing local declines; in California, the species is vulnerable to extirpation (NatureServe 2012). Within the program area and its vicinity, the species is somewhat rare, with less than three yearly sightings in the region during summer BBS counts from 2006 to 2010 (Sauer et al. 2011). State-wide, however, BBS trends may indicate an increase in abundance, although the data are of limited value due to the small sample size (Sauer et al. 2011). Given the lack of documented fatalities at repowered facilities in the program area, it is difficult to quantify the effects of a fully repowered program area on the regional prairie falcon population. Prairie falcons use a variety of foraging flight characteristics, including high soaring, making it difficult to hypothesize how repowered turbines may affect the risk of turbine collision. Careful monitoring of fatalities and implementing monitoring protocols that are likely to detect prairie falcon fatalities will be important for understanding impacts on this species and implementing adaptive management measures, as appropriate.

Red-Tailed Hawk. As shown in Table 3.4-11, the fully repowered 417 MW program area would be expected to result in an estimated 42–103 red-tailed hawk fatalities per year. Based on these estimates, the program could decrease the average annual fatalities by 29–71%.

An estimated 89% of the global population of red-tailed hawks (approximately 1,960,000 breeding birds) is found in North America (Hawk Mountain 2007). Populations have remained stable or increased throughout most of the western United States since the 1980s, growing 1.5% in California between 1983 and 2005 (Hawk Mountain 2007; Sauer et al. 2008). California foothill populations have remained stable since 1968, while the Central Valley population has significantly increased (Sauer et al. 2008).

Although a substantial number of red-tailed hawk fatalities occur in the APWRA, the annual fatalities have shown a generally decreasing trend since 2005, although not a statistically significant decline (ICF International 2012) and are predicted to continue to decline as repowering proceeds in the APWRA (Smallwood 2010; ICF International 2012). The yearly fatalities for red-tailed hawks presented in Table 3.4.11 coincide with these other studies, suggesting that repowering the program area is likely to continue to reduce the number of red-tailed hawks killed each year. Considering that the red-tailed hawk population in California has grown while the APWRA has been in operation, continued operation of repowered turbines in the program area is unlikely to have any population-level impacts on red-tailed hawk.

Swainson's Hawk. Only one Swainson's hawk fatality has been recorded in the APWRA, yielding an annual estimated fatality rate of approximately zero (Table 3.4-10). No Swainson's hawk fatalities were detected at Diablo Winds, Buena Vista, or Vasco Winds. Based on the low estimated fatality rate from nonrepowered sites, the lack of fatalities detected at repowered sites, and the relatively low use of the APWRA by Swainson's hawks, it is expected that the fatality rate for Swainson's hawk would remain low under the program.

Swainson's hawk is one of two (the other is sandhill crane) state-listed species that has a recorded fatality in the APWRA (ICF International 2012). While the program area does not provide high-value nesting or foraging habitat for the Swainson's hawk, neighboring agricultural areas in the northeasternmost corner of Alameda County and north of the APWRA in Contra Costa County do provide prime foraging habitat, and Swainson's hawk may cross into the program area occasionally. The Audubon Society (2007) includes Swainson's hawk on its Watch List as a declining or rare species of national conservation concern. Evidence from egg collections suggests that the California population has been reduced by as much as 90% from its estimated historical levels (Bloom 1980). This severe population decline in the Central Valley of California is corroborated by microsatellite analyses of DNA that suggest that the decline has taken place over 68–75 generations, or about 200 years, corresponding with the time of European settlement (Audubon Society 2007; Hull et al. 2008). Based on migration counts in Vera Cruz, Mexico, the present global population may approach 1 million individuals (HawkWatch International 2009). The California population is estimated at more 1,900 nesting pairs, 95% of which are in the Central Valley (Anderson et al. 2007). The BBS reports a rising California population since surveys began in 1968, but also reports that important deficiencies in the underlying data may make these trends inaccurate (Sauer et al. 2011).

The very small number of estimated fatalities in the program area compared to the size of the local population east of the program area in the Central Valley indicates that turbine-related fatalities in the program area are unlikely to have an adverse effect on the local Swainson's hawk population. The implementation of subsequent project-level avian use and fatality studies described in Mitigation Measure BIO-11g will continue to provide data for assessing the effect of turbine operation on the Swainson's hawk population in the area.

Raptors. As shown in Table 3.4-11, a fully repowered 417 MW program area would be expected to result in an estimated 129–505 raptor fatalities per year. Based on these estimates, the program could decrease average annual raptor fatalities by 37–84%.

Native non-raptors. As shown in Table 3.4-11, a fully repowered 417 MW program area would be expected to result in an estimated 421–1,047 native non-raptor fatalities per year. Based on these estimates, the program could decrease the average annual fatalities by 29–81%.

As described above, for all avian species analyzed, a fully repowered program area would be expected to reduce estimated fatality rates. However, fatalities would still be expected to result from the operation of the repowered turbines, and uncertainty surrounding the accuracy of the estimated fatality rates and the types of species potentially affected remains. Considering this information, and despite the anticipated reductions in avian impacts compared to the baseline rates, the County has determined to use a conservative approach for the impact assessment, concluding that turbine-related fatalities could constitute a substantial adverse effect on avian species because the rates for some or all of the species could be greater than the baseline rates. This impact would be significant. Implementation of Mitigation Measures BIO-11a through BIO-11i would reduce this impact, but not to a less-than-significant level; accordingly, this impact is considered significant and unavoidable. These measures, which individual project proponents would be required to carry out as appropriate in light of project-specific conditions, were derived from the EACCS, based on established practice, or developed in the context of the program's conservation objectives.

Mitigation Measure BIO-11a: Prepare a project-specific avian protection plan

All project proponents will prepare a project-specific APP to specify measures and protocols consistent with the program-level mitigation measures that address avian mortality. The project-specific APPs will include, at a minimum, the following components.

- Information and methods used to site turbines to minimize risk.
- Documentation that appropriate turbine designs are being used.
- Documentation that avian-safe practices are being implemented on project infrastructure.
- Methods used to discourage prey for raptors.
- A detailed description of the postconstruction avian fatality monitoring methods to be used (consistent with the minimum requirements outlined in Mitigation Measure BIO-11g).
- Methods used to compensate for the loss of raptors (consistent with the requirements of Mitigation Measure BIO-11h).

Each project applicant will prepare and submit a draft project-specific APP to the County. The draft APP will be reviewed by the TAC for consistency and the inclusion of appropriate mitigation measures that are consistent with the PEIR and recommended for approval by the County. Each project applicant must have an approved Final APP prior to commercial operation.

Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds

Siting of turbines—using analyses of landscape features and location-specific bird use and behavior data to identify locations with reduced collision risk—may result in reduced fatalities (Smallwood et al. 2009). All project proponents will conduct a siting process and prepare a siting analysis to select turbine locations to minimize potential impacts on bird and bat species. Proponents will utilize existing data as well as collect new site-specific data as part of the siting analysis.

Project proponents will utilize currently available guidelines such as the Alameda County SRC guidelines for siting wind turbines (Alameda County SRC 2010) and/or other currently available research or guidelines to conduct siting analysis. Additionally, project proponents will use the results of previous siting efforts to inform the analysis and siting methods as appropriate such that the science of siting continues to be advanced. All project proponents will collect field data that identify or confirm the behavior, utilization, and distribution patterns of affected avian and bat species prior to the installation of turbines. Project proponents will collect and utilize available existing information, including but not necessarily limited to: siting reports and monitoring data from previously installed projects; published use and abundance studies and reports; and topographic features known to increase collision risk (trees, riparian areas, water bodies, and wetlands).

Project proponents will also collect and utilize additional field data as necessary to inform the siting analysis for golden eagle. As required in Mitigation Measure BIO-8a, surveys will be conducted to locate golden eagle nests within 2 miles of proposed project areas. Siting of turbines within 2 miles of an active or alternative golden eagle nest or active golden eagle territory will be based on a site-specific analysis of risk based on the estimated eagle territories, conducted in consultation with USFWS.

Project proponents will utilize methods (i.e., computer models) to identify dangerous locations for birds and bats based on site-specific risk factors informed by the information discussed above. The project proponents will compile the results of the siting analyses for each turbine and document these in the project-level APP, along with the specific location of each turbine.

Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts

Use of turbines with certain characteristics is believed to reduce the collision risk for avian species. Project proponents will implement the design-related measures listed below.

- Turbine designs will be selected that have been shown or that are suspected to reduce avian fatalities, based on the height, color, configuration, or other features of the turbines.
- Turbine design will limit or eliminate perching opportunities. Designs will include a tubular tower with internal ladders; external catwalks, railings, or ladders will be prohibited.
- Turbine design will limit or eliminate nesting or roosting opportunities. Openings on turbines will be covered to prevent cavity-nesting species from nesting in the turbines.
- Lighting will be installed on the fewest number of turbines allowed by FAA regulations, and all pilot warning lights will fire synchronously. Turbine lighting will employ only red or dual red-and-white strobe, strobe-like, or flashing lights (U.S. Fish and Wildlife Service 2012). All lighting on turbines will be operated at the minimum allowable intensity, flashing frequency, and quantity allowed by FAA (Gehring et al. 2009; U.S. Fish and Wildlife Service 2012). Duration between flashes will be the longest allowable by the FAA.

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

All project proponents will apply the following measures when designing and siting turbine-related infrastructure. These measures will reduce the risk of bird electrocution and collision.

- 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 will 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.
- To the extent possible, all powerlines will be placed underground. However, lines may be placed aboveground immediately prior to entering the substation. All aboveground lines will be fitted with bird flight diverters or visibility enhancement devices (e.g., spiral damping devices). When lines cannot be placed underground, appropriate avian protection designs must be employed. As a minimum requirement, the collection system will conform with 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., laydown 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,

or 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-11e: Retrofit existing infrastructure to minimize risk to raptors

Any existing power lines in a specific project area that are owned by the wind project operator and that are associated with electrocution of an eagle or other raptor will be retrofitted within 30 days to make them raptor-safe according to Avian Power Line Interaction Committee guidelines. All other existing structures to remain in a project area during repowering will be retrofitted, as feasible, according to specifications of Mitigation Measure BIO-11c prior to repowered turbine operation.

Mitigation Measure BIO-11f: Discourage prey for raptors

All project proponents will apply the following measures when designing and siting turbine-related infrastructure. These measures are intended to minimize opportunities for fossorial mammals to become established and thereby create a prey base that could become an attractant for raptors.

- Rodenticide will not be utilized on the project site to avoid the risk of raptors scavenging the remains of poisoned animals.
- Boulders (rocks more than 12 inches in diameter) excavated during project construction may be placed in aboveground piles in the project area so long as they are more than 500 meters (1,640 feet) from any turbine. Existing rock piles created during construction of first- and second-generation turbines will also be moved at least 500 meters (1,640 feet) from turbines.
- Gravel will be placed around each tower foundation to discourage small mammals from burrowing near turbines.

Mitigation Measure BIO-11g: Implement postconstruction avian fatality monitoring for all repowering projects

A postconstruction monitoring program will be conducted at each repowering project for a minimum of 3 years beginning on the commercial operation date (COD) of the project. Monitoring may continue beyond 3 years if construction is completed in phases. Moreover, if the results of the first 3 years indicate that baseline fatality rates (i.e., nonrepowered fatality rates) are exceeded, monitoring will be extended until the average annual fatality rate has dropped below baseline fatality rates for 2 years, and to assess the effectiveness of adaptive management measures specified in Mitigation Measure BIO-11i. An additional 2 years of monitoring will be implemented at year 10 (i.e., the tenth anniversary of the COD). Project proponents will provide access to qualified third parties authorized by the County to conduct any additional monitoring after the initial 3-year monitoring period has expired and before and after the additional 2-year monitoring period, provided that such additional monitoring utilizes scientifically valid monitoring protocols.

A technical advisory committee (TAC) will be formed to oversee the monitoring program and to advise the County on adaptive management measures that may be necessary if fatality rates substantially exceed those predicted for the project (as described below in Mitigation Measure

BIO-11i). The TAC will have a standing meeting, which will be open to the public, every 6 months to review monitoring reports produced by operators in the program area. In these meetings, the TAC will discuss any issues raised by the monitoring reports and recommend to the County next steps to address issues, including scheduling additional meetings, if necessary.

The TAC will comprise representatives from the County (including one or more technical consultants, such as a biostatistician, an avian biologist, and a bat biologist), and wildlife agencies (CDFW, USFWS). Additional TAC members may also be considered (e.g., a representative from Audubon, a landowner in the program area, a representative of the operators) at the discretion of the County. The TAC will be a voluntary and advisory group that will provide guidance to the County Planning Department. To maintain transparency with the public, all TAC meetings will be open to the public, and notice of meetings will be given to interested parties.

The TAC will have three primary advisory roles: (1) to review and advise on project planning documents (i.e., project-specific APPs) to ensure that project-specific mitigation measures and compensatory mitigation measures described in this PEIR are appropriately and consistently applied, (2) to review and advise on monitoring documents (protocols and reporting) for consistency with the mitigation measures, and (3) to review and advise on implementation of the adaptive management plans.

Should fatality monitoring reveal that impacts exceed the baseline thresholds established in this PEIR, the TAC will advise the County on requiring implementation of adaptive management measures as described in Mitigation Measure BIO-11i. The County will have the decision-making authority, as it is the organization issuing the CUPs. However, the TAC will collaboratively inform the decisions of the County.

Operators are required to provide for avian use surveys to be conducted within the project area boundaries for a minimum of 30 minutes duration. Surveyors will be qualified and trained and subject to approval by the County.

Carcass surveys will be conducted at every turbine for projects with 20 or fewer turbines. For projects with more than 20 turbines, such surveys will be required at a minimum of 20 turbines, and a sample of the remaining turbines may be selected for carcass searches. The operator will be required to demonstrate that the sampling scheme and sample size are statistically rigorous and defensible. Where substantial variation in terrain, land cover type, management, or other factors may contribute to significant variation in fatality rates, the sampling scheme will be stratified to account for such variation. The survey protocol for sets and subsets of turbines, as well as proposed sampling schemes that do not entail a search of all turbines, must be approved by the County in consultation with the TAC prior to the start of surveys.

The search interval will not exceed 14 days for the minimum of 20 turbines to be surveyed; however, the search interval for the additional turbines (i.e., those exceeding the 20-turbine minimum) that are to be included in the sampling scheme may be extended up to 28 days or longer if recommended by the TAC.

The estimation of detection probability is a rapidly advancing field. Carcass placement trials, broadly defined, will be conducted to estimate detection probability during each year of monitoring. Sample sizes will be large enough to potentially detect significant variation by season, carcass size, and habitat type.

Operators will be required to submit copies of all raw data forms to the County annually, will supply raw data in a readily accessible digital format to be specified by the County, and will prepare raw data for inclusion as appendices in the annual reports. The intent is to allow the County to conduct independent analyses and meta-analyses of data across the APWRA, and to supply these data to the regulatory agencies if requested.

Annual reports submitted to the County will provide a synthesis of all information collected to date. Each report will provide an introduction; descriptions of the study area, methods, and results; a discussion of the results; and any suitable recommendations. Reports will provide raw counts of fatalities, adjusted fatality rates, and estimates of project-wide fatalities on both a per MW and per turbine basis.

Mitigation Measure BIO-11h: Compensate for the loss of raptors and other avian species, including golden eagles, by contributing to conservation efforts

Discussion

Several options to compensate for impacts on raptors are currently available. Some are targeted to benefit certain species, but they may also have benefits for other raptor and non-raptor species. For example, USFWS's ECP Guidelines currently outline a compensatory mitigation strategy for golden eagles using the retrofit of high-risk power poles (poles known or suspected to electrocute and kill eagles). The goal of this strategy is to eliminate hazards for golden eagles. However, because the poles are also dangerous for other large raptors (e.g., red-tailed hawk, Swainson's hawk), retrofitting them can benefit such species as well as eagles.

Similarly, although the retrofitting of electrical poles may have benefits for large raptors, such an approach may provide minimal benefits for smaller raptors such as American kestrel and burrowing owl. Consequently, additional measures would be required components of an overall mitigation package to compensate for impacts on raptors in general.

The Secretary of the Interior issued Order 3330 on October 31, 2013, outlining a new approach to mitigation policies and practices of the Department of the Interior. This approach recognizes that certain strategies aimed at some species (e.g., raptors) can provide substantial benefit to others (e.g., non-raptors) and to the ecological landscape as a whole. The landscape-scale approach to mitigation and conservation efforts is now central to the Department's mitigation strategy. Although the Order was intended for use by federal agencies and as such is not directly applicable to the County, it is evident that such an approach would likely have the greatest mitigation benefits, especially when considering ongoing and long-term impacts from wind energy projects.

With these considerations in mind, the County has outlined several options that are currently available to compensate for impacts on raptors and other avian species. The options discussed below are currently considered acceptable approaches to compensation for impacts on raptors and other species. Although not every option is appropriate for all species, it is hoped that as time proceeds, a more comprehensive landscape-level approach to mitigation will be adopted to benefit a broader suite of species than might benefit from more species-specific measures. The County recognizes that the science of raptor conservation and the understanding of wind-wildlife impacts are continuing to evolve and that the suite of available compensation options may consequently change over the life of the proposed projects.

Conservation Measures

To promote the conservation of raptors and other avian species, project proponents will compensate for raptor fatalities estimated within their project areas. Mitigation will be provided in 10-year increments, with the first increment based on the estimates (raptors/MW/year) provided in this PEIR for the Vasco Winds Project (Table 3.4-10) or the project-specific EIR for future projects. The Vasco Winds fatality rates were selected because the Vasco turbines are the most similar to those likely to be proposed for future repowering projects and consequently represent the best available fatality estimates. Each project proponent will conduct postconstruction fatality monitoring for at least 3 years beginning at project startup (date of commercial operation) and again for 2 years at year 10, as required under Mitigation Measure BIO-11g, to estimate the average number of raptors taken each year by each individual project. The project proponent will compensate for this number of raptors in subsequent 10-year increments for the life of the project (i.e., three 10-year increments) as outlined below. Mitigation Measure BIO-11g also requires additional fatality monitoring at year 10 of the project. The results of the first 3 years of monitoring and/or the monitoring at year 10 may lead to revisions of the estimated average number of raptors taken, and mitigation provided may be adjusted accordingly on a one-time basis within each of the first two 10-year increments, based on the results of the monitoring required by Mitigation Measure BIO-11g, in consultation with the TAC.

Prior to the start of operations, project proponents will submit for County approval an avian conservation strategy, as part of the project-specific APP outlined in Mitigation Measure BIO-11a, outlining the estimated number of raptor fatalities based on the number and type of turbines being constructed, and the type or types of compensation options to be implemented. Project proponents will use the avian conservation strategy to craft an appropriate strategy using a balanced mix of the options presented below, as well as considering new options suggested by the growing body of knowledge during the course of the project lifespan, as supported by a Resource Equivalency Analysis (REA) (see example in Appendix C) or similar type of compensation assessment acceptable to the County that demonstrates the efficacy of proposed mitigation for impacts on raptors.

The County Planning Director, in consultation with the TAC, will consider, based on the REA, whether the proposed avianconservation strategy is adequate, including consideration of whether each avian mitigation plan incorporates a landscape-scale approach such that the conservation efforts achieve the greatest possible benefits. Compensation measures as detailed in an approved avian conservation strategy must be implemented within 1 year of the date of commercialoperations. Avian conservation strategies will be reviewed and may be revised by the County every 10 years, and on a one-time basis in each of the two 10-year increments based on the monitoring required by Mitigation Measure BIO-11g.

- **Retrofitting high-risk electrical infrastructure.** USFWS's ECP Guidelines outline a compensatory mitigation strategy using the retrofit of high-risk power poles (poles known or suspected to electrocute and kill eagles). USFWS has developed an REA (U.S. Fish and Wildlife Service 2013a) as a tool to estimate the compensatory mitigation (number of retrofits) required for the take of eagles. The REA takes into account the current understanding of eagle life history factors, the effectiveness of retrofitting poles, the expected annual take, and the timing of implementation of the pole retrofits. The project proponents may need to contract with a utility or a third-party mitigation account (such as the National Fish and Wildlife Foundation) to retrofit the number of poles needed as demonstrated by a project-specific REA. If contracting directly, the project proponent will consult with utility companies to ensure that high-risk poles have been identified for retrofitting. Proponents will agree in writing to pay the utility owner/operator to retrofit the required number of power poles and maintain the retrofits for 10 years and will provide the County with documentation of the retrofit agreement. The first retrofits will be based on the estimated number of eagle fatalities as described above in this measure or as developed in the project-specific EIR for future projects. Subsequent numbers of retrofits required for additional 10-year durations will be based on the results of project-specific fatality monitoring as outlined in Mitigation Measure BIO-11g. If fewer eagle fatalities are identified through the monitoring, the number of future required retrofits may be reduced through a project-specific REA. Although retrofitting poles has not been identified as appropriate mitigation for other large raptors, they would likely benefit from such efforts, as they (particularly red-tailed and Swainson's hawks) constitute the largest non-eagle group to suffer electrocution on power lines (Avian Power Line Interaction Committee 2006).

- **Measures outlined in an approved Eagle Conservation Plan and Bird and Bat Conservation Strategy.** Project proponents may elect to apply for programmatic eagle take permits from USFWS. The programmatic eagle take permit process currently involves preparation of an ECP and a Bird and Bat Conservation Strategy (BBCS). The ECP specifies avoidance and minimization measures, advanced conservation practices, and compensatory mitigation for eagles—conditions that meet USFWS's criteria for issuance of a permit. The BBCS outlines measures being implemented by the applicant to avoid and minimize impacts on migratory birds, including raptors. If programmatic eagle take permits are obtained by project proponents, those permit terms, including the measures outlined in the approved ECP and BBCS, may constitute an appropriate conservation measure for estimated take of golden eagles and other raptors, provided such terms are deemed by the County to be comparable to or more protective of raptors than the other options listed herein.
- **Contribute to raptor conservation efforts.** Project proponents will contribute funds, in the amount of $580/raptor fatality, in 10-year increments to local and/or regional conservation efforts designed to protect, recover, and manage lands for raptors, or to conduct research involving methods to reduce raptor fatalities or increase raptor productivity. The $580 amount is based on the average cost to rehabilitate one raptor at the California Raptor Center, affiliated with the UC Davis School of Veterinary Medicine, which receives more than 200 injured or ill raptors annually (Stedman pers. comm.). Ten-year installments are more advantageous than more frequent installments for planning and budgeting purposes.

  The funds will be contributed to an entity or entities engaged in these activities, such as the East Bay Regional Park District and the Livermore Area Regional Park District. Conservation efforts may include constructing and installing nest boxes and perches, conducting an awareness campaign to reduce the use of rodenticide, and conducting research to benefit raptors. The specific conservation effort to be pursued will be submitted to the County for approval as part of the avian conservation strategy review process. The donation receipt will be provided to the County as evidence of payment.

  The first contributions for any given project will be based on the estimated number of raptor fatalities as described above in this measure or as developed in the project-specific EIR for future projects. Funds for subsequent 10-year installments will be provided on the basis of the average annual raptor fatality rates determined through postconstruction monitoring efforts, allowing for a one-time adjustment within each 10-year increment after the results of the monitoring efforts are available. If fewer raptor fatalities are detected through the monitoring effort, the second installment amount may be reduced to account for the difference between the first estimated numbers and the monitoring results.

- **Contribute to regional conservation of raptor habitat.** Project proponents may address regional conservation of raptor habitat by funding the acquisition of conservation easements within the APWRA or on lands in the same eco-region outside the APWRA, subject to County approval, for the purpose of long-term regional conservation of raptor habitat. Lands proposed for conservation must be well-managed grazing lands similar to those on which the projects have been developed. Project proponents will fund the regional conservation and improvement of lands (through habitat enhancement, lead abatement activities, elimination of rodenticides, and/or other measures) using a number of acres equivalent to the conservation benefit of the raptor recovery and conservation efforts described above, or as determined through a project-specific REA (see example REA in Appendix C). The conservation lands must be provided for compensation of a minimum of 10 years of raptor fatalities, as 10-year increments will minimize the transaction costs associated with the identification and conservation of lands, thereby increasing overall cost effectiveness. The conservation easements will be held by an organization whose mission is to purchase and/or otherwise conserve lands, such as The Trust for Public Lands, The Nature Conservancy, California Rangeland Trust, or the East Bay Regional Parks District. The project proponents will obtain approval from the County regarding the amount of conserved lands, any enhancements proposed to increase raptor habitat value, and the entity holding the lands and/or conservation easement.
- **Other Conservation Measures Identified in the Future.** As noted above, additional conservation measures for raptors may become available in the future. Conservation measures for raptors are currently being developed by USFWS and nongovernmental organizations (e.g., American Wind Wildlife Institute)—for example, activities serving to reduce such fatalities elsewhere, and enhancing foraging and nesting habitat. Additional options for conservation could include purchasing credits at an approved mitigation bank, credits for the retirement of windfarms that are particularly dangerous to birds or bats, the curtailment of prey elimination programs, and hunter-education programs that remove sources of lead from the environment. Under this option, the project proponent may make alternative proposals to the County for conservation measures—based on an REA or similar compensation assessment—that the County may accept as mitigation if they are deemed by the County to be comparable to or more protective of raptor species than the other options described herein.

Mitigation Measure BIO-11i: Implement an avian adaptive management program

If fatality monitoring described in Mitigation Measure BIO-11g results in an estimate that exceeds the preconstruction baseline fatality estimates (i.e., estimates at the nonrepowered turbines as described in this PEIR) for any focal species or species group (i.e., individual focal species, all focal species, all raptors, all non-raptors, all birds combined), project proponents will prepare a project-specific adaptive management plan within 2 months following the availability of the fatality monitoring results. These plans will be used to adjust operation and mitigation to the results of monitoring, new technology, and new research to ensure that the best available science is used to minimize impacts to below baseline. Project-specific adaptive management plans will be reviewed by the TAC, revised by project proponents as necessary, and approved by the County. The TAC will take current research and the most effective impact reduction strategies into account when reviewing adaptive management plans and suggesting measures to reduce impacts. The project-specific adaptive management plans will be implemented within 2 months of approval by the County. The plans will include a stepped approach whereby an adaptive measure or measures are implemented, the results are monitored for success or failure for a year, and additional adaptive measures are added as necessary, followed by another year of monitoring, until the success criteria are achieved (i.e., estimated fatalities are below the baseline). Project proponents should use the best measures available when the plan is prepared in consideration of the specific adaptive management needs. For example, if only one threshold is exceeded, such as golden eagle fatalities, the plan and measures used will target that species. As set forth in other agreements in the APWRA, project proponents may also focus adaptive management measures on individual or multiple turbines if those turbines are shown to cause a significantly disproportionate number of fatalities.

In general, the following types of measures will be considered by the TAC, in the order they are presented below; however, the TAC may recommend any of these or other measures that are shown to be successful in reducing the impact.

ADMM-1: Visual Modifications. The project proponent could paint a pattern on a proportion of the turbine blades. The proportion and the pattern of the blades to be painted will be determined by the County in consultation with the TAC. USFWS recommends testing measures to reduce *motion smear*—the blurring of turbine blades due to rapid rotation that renders them less visible and hence more perilous to birds in flight. Suggested techniques include painting blades with staggered stripes or painting one blade black. The project proponent will conduct fatality studies on a controlled number of painted and unpainted turbines. The project proponent will coordinate with the TAC to determine the location of the painted turbines, but the intent is to implement this measure in areas that appear to be contributing most to the high number of fatalities detected.

ADMM-2: Anti-Perching Measures. The County will consult with the TAC regarding the use of anti-perching measures to discourage bird use of the area. The TAC will use the most recent research and information available to determine, on a case-by–case basis, if anti-perching measures will be an effective strategy to reduce impacts. If determined to be feasible, anti-perching devices will be installed on artificial structures, excluding utility poles, within 1 mile of project facilities (with landowner permission) to discourage bird use of the area.

ADMM-3: Prey Reduction. The project proponent will implement a prey reduction program around the most hazardous turbines. Examples of prey reduction measures may include changes in grazing practices to make the area less desirable for prey species, active reduction through direct removal of prey species, or other measures provided they are consistent with management goals for threatened and endangered species.

ADMM-4: Implementation of Experimental Technologies. Project proponents can deploy experimental technologies at their facilities to test their efficacy in reducing turbine-related fatalities. Examples may include, but are not limited to, visual deterrents, noise deterrents, and active radar systems.

ADMM-5: Turbine Curtailment. If postconstruction monitoring indicates patterns of turbine-caused fatalities—such as seasonal spikes in fatalities, topographic or other environmental features associated with high numbers of fatalities, or other factors that can potentially be manipulated and that suggest that curtailment of a specific turbine's operation would result in reducing future avian fatalities—the project operator can curtail operations of the offending turbine or turbines. Curtailment restrictions would be developed in coordination with the TAC and based on currently available fatality data, use data, and research.

ADMM-6: Cut-in Speed Study. Changes in cut-in speed could be conducted to see if changing cut-in speeds from 3 meters per second to 5 meters per second (for example) would significantly reduce avian fatalities. The proponent will coordinate with the TAC in determining the feasibility of the measure for the particular species affected as well as the amount of the change in the cut-in speed.

ADMM-7: Real-Time Turbine Curtailment. The project proponent can employ a real-time turbine curtailment program designed in consultation with the TAC. The intent would be to deploy a biologist to monitor onsite conditions and issue a curtailment order when raptors are near operating turbines. Alternatively, radar, video, or other monitoring measures could be deployed in place of a biological monitor if there is evidence to indicate that such a system would be as effective and more efficient than use of a human monitor.

Impact BIO-11a-2: Avian mortality resulting from interaction with wind energy facilities—program Alternative 2: 450 MW (significant and unavoidable)

The operation of wind energy facilities has been shown to cause avian fatalities through collisions with wind turbines and powerlines and through electrocution on powerlines.

Most collection lines for first- and second- generation turbines are aboveground facilities. As repowering projects are implemented, old collection systems would be removed and new collection systems would be installed. The majority of new collection lines associated with the program would be undergrounded, reducing the risk of avian fatality from electrocution or collision with powerlines.

Diablo Winds, Buena Vista, and Vasco Winds are the only repowered projects in the APWRA for which estimates of avian fatality rates are available. Based on these estimates, avian collision risk may be substantially reduced when older-generation turbines are replaced by newer, larger turbines with the same total rated nameplate capacity (Table 3.4-10). However, while the available evidence suggests that repowering could substantially reduce turbine-related avian fatalities below the levels documented for older generation turbines, avian fatalities would continue to occur. Moreover, while repowering is intended to reduce fatalities, enough uncertainty remains in light of project- and site-specific data to warrant a conservative approach in the impact analysis. Accordingly, the continued loss of birds (including special-status species) at a rate potentially greater than the existing baseline fatality rates is considered a significant and unavoidable impact.

It should be noted that turbines used in future repowering projects are likely to be of similar size to the Vasco Winds turbines but much larger than the Diablo Winds and Buena Vista turbines in both overall size and rated nameplate capacity. There is evidence to suggest that larger turbines—like those used in the Vasco Winds project—could result in additional decreases in avian fatality rates for bird species currently killed in the APWRA (Smallwood and Karas 2009). However, it is also possible that larger turbines may negatively affect a different suite of bird species that have been relatively unaffected by older (i.e., smaller) turbines. In addition, fatality rates in the APWRA are highly variable (that is, because they differ across years, turbines types, geographies, and topographies, species impacts may differ between sites due to different levels of use) and potentially imprecise (Smallwood et al. 2010; ICF International 2013). Nonetheless, these three repowering projects represent the best available information to understand the potential for avian fatalities associated with repowering; accordingly, data from these projects were used to form the basis for avian fatality estimates. The estimated changes associated with Alternative 2 are shown in Table 3.4-12 and discussed below. Postconstruction monitoring, once the turbines are in operation, will provide data to quantify the actual extent of change in avian fatalities from repowering and the extent of avian fatality for projects in the program area, and will contribute to the body of knowledge supporting future analyses.

Table 3.4-12. Estimated Annual Avian Fatalities for Existing and Repowered Program Area—Alternative 2 (450 MW)

	Estimated Annual Fatalities for Program Area						
	Nonrepowered	Repowered					
		Diablo Winds[a]		Buena Vista[b]		Vasco Winds[c,d]	
Species	Average Annual Fatalities	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease
American kestrel	194.2	40.5	79	67.5	65	133.7	31
Barn owl	79.5	9.0	89	0.0	0	14.9	81
Burrowing owl	255.1	378.0	-48	0.0	100	22.5	91
Golden eagle	26.6	4.5	83	18.0	32	14.4	46
Loggerhead shrike	61.8	0.0	100	0.0	100	0.0	100
Prairie falcon	6.6	0.0	100	0.0	100	0.0	100
Red-tailed hawk	144.5	90.0	38	45.0	69	110.7	23
Swainson's hawk	0.5	0.0	100	0.0	100	0.0	100
All raptors	799.9	544.5	32	139.5	83	288.9	64
All native non-raptors	1,482.0	1,129.5	24	454.5	69	942.3	36

Note: fatality rates reflect annual fatalities (95% confidence interval).

[a] Diablo Winds fatality rates extrapolated to the overall program area.

[b] Buena Vista fatality rates extrapolated to the overall program area.

[c] Vasco Winds fatality rates extrapolated to the overall program area.

[d] Vasco Winds fatality rate for golden eagle based on updated information received from NextEra Energy Resources on July 21, 2014, and extrapolated to the overall program area.

American Kestrel. As shown in Table 3.4-12, a fully repowered 450 MW program area would be expected to result in an estimated 41–138 American kestrel fatalities per year. Based on these estimates, the program could decrease average annual fatalities by 31–79%. The potential impact of repowering on the American kestrel population would be similar to that described in Impact BIO-11a-1.

Barn Owl. As shown in Table 3.4-12, a fully repowered 450 MW program area would be expected to result in an estimated 9–15 barn owl fatalities per year. Based on these estimates, the program could decrease average annual fatalities by 81–89%. The potential impact of repowering on the barn owl population would be similar to that described in Impact BIO-11a-1.

Burrowing Owl. As shown in Table 3.4-12, a fully repowered 450 MW program area would be expected to result in an estimated 23–378 burrowing owl fatalities per year—a change ranging from a 91% decrease to a 48% increase in fatalities. This fatality estimate is based on data from Diablo Winds and Vasco Winds because no burrowing owl fatalities were detected at Buena Vista. Current evidence suggests that burrowing owl fatality rates are not reduced by the transition from old- to new-generation turbines to the same extent as the fatality rates of other species. The increase in energy production from 329 MW to 450 MW would likely result in a small estimated increase in burrowing owl fatalities per year. However, a growing body of circumstantial evidence indicates that many of the burrowing owl fatalities found during fatality surveys are due to predation rather than turbine collision. Because of this confounding effect, the potential reduction in turbine-related burrowing owl fatalities may be underestimated because of the inability to distinguish fatalities resulting from predation from those caused by turbine collision (ICF International 2013). The potential impact of repowering on the burrowing owl population would be similar to that described in Impact BIO-11a-1.

Golden Eagle. As shown in Table 3.4-12, a fully repowered 450 MW program area would be expected to result in an estimated 5–18 golden eagle fatalities per year. Based on these estimates, the program could decrease average annual fatalities by 32–83%. The potential impact of repowering on the golden eagle population would be similar to that described in Impact BIO-11a-1.

Loggerhead Shrike. No documented fatalities of loggerhead shrikes have occurred at the Diablo Winds, Buena Vista, or Vasco Winds projects (Table 3.4-10), although loggerhead shrikes are regularly detected in the vicinity of the Diablo Winds turbines. The lack of documented fatalities may suggest a reduced level of fatality from the repowered turbines at these sites. The potential impact of repowering on the loggerhead shrike population would be similar to that described in Impact BIO-11a-1.

Prairie Falcon. Fatality estimates at repowered sites are not available for prairie falcon because no fatalities have been documented at Diablo Winds or Vasco Winds and only one fatality has been recorded at Buena Vista (Table 3.4-10). Therefore, it is difficult to estimate the annual fatalities that would result from a fully repowered program area. The lack of documented fatalities may suggest a reduced level of fatality from the repowered turbines at these sites. However, the nonrepowered fatality rate for prairie falcon is already relatively low (0.02 fatality/MW/year), suggesting that the collision risk for this species is low. Prairie falcon occurs mostly in winter, and the baseline fatality rate is measured during a period when the seasonal shutdown has been in effect. Repowered turbines do not shut down in winter. The potential impact of repowering on the prairie falcon population would be similar to that described in Impact BIO-11a-1.

Red-Tailed Hawk. As shown in Table 3.4-12, the fully repowered 450 MW program area would be expected to result in an estimated 45–111 red-tailed hawk fatalities per year. Based on these estimates, the program could decrease the average annual fatalities by 23–69%. The potential impact of repowering on the red-tailed hawk population would be similar to that described in Impact BIO-11a-1.

Swainson's Hawk. There is only one recorded Swainson's hawk fatality in the APWRA, resulting in an annual estimated fatality rate of approximately zero (Table 3.4-10). No Swainson's hawk fatalities were detected at Diablo Winds, Buena Vista, or Vasco Winds. Based on the low estimated fatality rate from nonrepowered sites, the lack of fatalities detected at repowered sites, and the relatively low use of the APWRA by Swainson's hawks, it is expected that the fatality rate for

Swainson's hawk would remain low under the program. The potential impact of repowering on the Swainson's hawk population would be similar to that described in Impact BIO-11a-1.

Raptors. As shown in Table 3.4-12, a fully repowered 450 MW program area would be expected to result in an estimated 140–545 raptor fatalities per year. Based on these estimates, the program could decrease average annual raptor fatalities by 32–83%.

Native non-raptors. As shown in Table 3.4-12, a fully repowered 450 MW program area would be expected to result in an estimated 455–1,130 native non-raptor fatalities per year. Based on these estimates, the program could decrease the average annual fatalities by 24–69%.

As described above, for all avian focal species analyzed, a fully repowered program area would be expected to reduce estimated fatality rates. However, fatalities would still be expected to result from the operation of the repowered turbines, and uncertainty surrounding the accuracy of the estimated fatality rates and the types of species potentially affected remains. Considering this information, and despite the anticipated reductions in avian impacts compared to the baseline rates, the County has determined to use a conservative approach for the impact assessment, concluding that turbine-related fatalities could constitute a substantial adverse effect on avian species because the rates for some or all of the species could be greater than the baseline rates. This impact would be significant. Implementation of Mitigation Measures BIO-11a through BIO-11i would reduce this impact, but not to a less-than-significant level; accordingly, this impact is considered significant and unavoidable.

Mitigation Measure BIO-11a: Prepare a project-specific avian protection plan

Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds

Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts

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

Mitigation Measure BIO-11e: Retrofit existing infrastructure to minimize risk to raptors

Mitigation Measure BIO-11f: Discourage prey for raptors

Mitigation Measure BIO-11g: Implement postconstruction avian fatality monitoring for all repowering projects and implement adaptive management measures as necessary

Mitigation Measure BIO-11h: Compensate for the loss of raptors and other avian species, including golden eagles, by contributing to conservation efforts

Mitigation Measure BIO-11i: Implement an avian adaptive management program

Impact BIO-11b: Avian mortality resulting from interaction with wind energy facilities—Golden Hills Project (significant and unavoidable)

The operation of repowered turbines in the Golden Hills project area would be expected to result in a reduction in avian fatalities below the number estimated to occur from nonrepowered turbines. However, as discussed above in Impact BIO-11a-1, repowering would not eliminate avian turbine-related fatalities, considerable uncertainty surrounding the comparative dataset remains, and fatalities from turbine collision would still constitute a significant and unavoidable impact. The estimated reduction in annual fatalities differs by species and species group. These reductions are presented in Table 3.4-13 and summarized below.

Table 3.4-13. Estimated Annual Avian Fatalities for Existing and Repowered Golden Hills Project Area

	Estimated Annual Fatalities for Program Area						
	Nonrepowered	Repowered					
		Diablo Winds[a]		Buena Vista[b]		Vasco Winds[c,d]	
Species	Average Annual Fatalities	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease
American kestrel	47.5	8.0	83	13.3	72	26.3	45
Barn owl	19.4	1.8	91	–	–	2.9	85
Burrowing owl	62.4	74.3	-19	0.0	100	4.4	93
Golden eagle	6.5	0.9	86	3.5	46	2.8	57
Loggerhead shrike	15.1	0.0	100	0.0	100	0.0	100
Prairie falcon	1.6	0.0	100	0.0	100	0.0	100
Red-tailed hawk	35.4	17.7	50	8.8	75	21.7	39
Swainson's hawk	0.1	0.0	100	0.0	100	0.0	100
All raptors	195.7	107.0	45	27.4	86	56.8	71
All native non-raptors	362.6	221.9	39	89.3	75	185.1	49

Note: fatality rates reflect annual fatalities (95% confidence interval).

[a] Diablo Winds fatality rates extrapolated to the Golden Hills project area.

[b] Buena Vista fatality rates extrapolated to the Golden Hills project area.

[c] Vasco Winds fatality rates extrapolated to the Golden Hills project area.

[d] Vasco Winds fatality rate for golden eagle based on updated information received from NextEra Energy Resources on July 21, 2014, and extrapolated to the Golden Hills project area.

American Kestrel. As shown in Table 3.4-13, the repowered 88.4 MW Golden Hills project would be expected to result in an estimated 8–26 American kestrel fatalities per year—a 45–83% decrease. The potential impact of repowering on the American kestrel population would be similar to that described in Impact BIO-11a-1.

Barn Owl. As shown in Table 3.4-13, the repowered 88.4 MW Golden Hills project would be expected to result in an estimated two to three barn owl fatalities per year—an 85–91% decrease. This fatality estimate is based on fatality rates for the Diablo Winds and Vasco Winds projects; fatality estimates for barn owl were not available from the Buena Vista project. The potential impact of repowering on the barn owl population would be similar to that described in Impact BIO-11a-1.

Burrowing Owl. As shown in Table 3.4-13, the repowered 88.4 MW Golden Hills project would be expected to result in an estimated 4–74 burrowing owl fatalities per year—a change ranging from a 91% decrease to a 19% increase in fatalities.

However, a growing body of circumstantial evidence indicates that many of the burrowing of fatalities found during fatality surveys are due to predation rather than turbine collision. Because of this confounding effect, the potential reduction in turbine-related burrowing owl fatalities may be underestimated because of the inability to distinguish fatalities resulting from predation from those caused by turbine collision. The potential impact of repowering on the burrowing owl population would be similar to that described in Impact BIO-11a-1.

Golden Eagle. As shown in Table 3.4-13, the repowered 88.4 MW Golden Hills project would be expected to result in from less than one to four golden eagle fatalities per year—a 46–86% decrease. The potential impact of repowering on the golden eagle population would be similar to that described in Impact BIO-11a-1.

Loggerhead Shrike. No documented fatalities of loggerhead shrikes have occurred at the Diablo Winds, Buena Vista, or Vasco Winds projects (Table 3.4-13), although loggerhead shrikes are regularly detected in the vicinity of the Diablo Winds turbines. The lack of documented fatalities suggests that there may be a reduced level of fatality from the repowered turbines at the Golden Hills project site. The potential impact of repowering on the loggerhead shrike population would be similar to that described in Impact BIO-11a-1.

Prairie Falcon. Fatality estimates at repowered sites are not available for prairie falcon because no fatalities have been documented at Diablo Winds or Vasco Winds and only one fatality has been recorded at Buena Vista (Table 3.4-13). Therefore, it is difficult to estimate the annual fatalities that would result from the repowered Golden Hills project. The lack of documented fatalities suggests there may be a reduced level of fatality from the repowered turbines at the Golden Hills project site. However, the nonrepowered fatality rate for prairie falcon is already relatively low (0.02 fatality/MW/year), suggesting that the collision risk for this species is low. Prairie falcon occurs mostly in winter, and the baseline fatality rate is measured during a period when the seasonal shutdown has been in effect. Repowered turbines do not shut down in winter. The potential impact of repowering on the prairie falcon population would be similar to that described in Impact BIO-11a-1.

Red-Tailed Hawk. As shown in Table 3.4-13, the repowered 88.4 MW Golden Hills Project would be expected to result in an estimated 9–22 red-tailed hawk fatalities per year—a 35–75% decrease. The potential impact of repowering on the red-tailed hawk population would be similar to that described in Impact BIO-11a-1.

Swainson's Hawk. There is only one recorded Swainson's hawk fatality in the APWRA, resulting in an annual estimated fatality rate of approximately zero (Table 3.4-13). No Swainson's hawk fatalities were detected at Diablo Winds, Buena Vista, or Vasco Winds. Based on the low estimated fatality rate from nonrepowered sites, the lack of fatalities detected at repowered sites, and the relatively low number of detections during avian use surveys conducted by the AFMT (Alameda County unpublished data), it is expected that the fatality rate for Swainson's hawk would remain near zero at the repowered Golden Hills project. The potential impact of repowering on the Swainson's hawk population would be similar to that described in Impact BIO-11a-1.

Raptors. As shown in Table 3.4-13, the repowered 88.4 MW Golden Hills project would be expected to result in an estimated 27–107 raptor fatalities per year—a 45–86% decrease.

Native non-raptors. As shown in Table 3.4-13, the repowered 88.4 MW Golden Hills project would be expected to result in an estimated 89–222 native non-raptor fatalities per year—a 39–75% decrease.

As described above, for all avian focal species analyzed, the repowered Golden Hills project would be expected to reduce estimated fatality rates. However, fatalities would still be expected to result from the operation of the repowered turbines, and uncertainty surrounding the accuracy of the estimated fatality rates and the types of species potentially affected remains. Considering this information, and despite the anticipated reductions in avian impacts compared to the baseline rates, the County has determined to use a conservative approach for the impact assessment, concluding that turbine-related fatalities could constitute a substantial adverse effect on avian species because the rates for some or all of the species could be greater than the baseline rates. This impact would be significant. Implementation of Mitigation Measures BIO-12a through BIO-12j would reduce this impact, but not to a less-than-significant level; accordingly, this impact is considered significant and unavoidable.

Mitigation Measure BIO-11a: Prepare a project-specific avian protection plan

Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds

Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts

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

Mitigation Measure BIO-11e: Retrofit existing infrastructure to minimize risk to raptors

Mitigation Measure BIO-11f: Discourage prey for raptors

Mitigation Measure BIO-11g: Implement postconstruction avian fatality monitoring for all repowering projects and implement adaptive management measures as necessary

Mitigation Measure BIO-11h: Compensate for the loss of raptors and other avian species, including golden eagles, by contributing to conservation efforts

The County anticipates that the mitigation fees required by the 2010 Agreement to Repower Turbines at the Altamont Pass Wind Resource Area will satisfy this mitigation measure for the Golden Hills Project.

Mitigation Measure BIO-11i: Implement an avian adaptive management program

Impact BIO-11c: Avian mortality resulting from interaction with wind energy facilities—Patterson Pass Project (significant and unavoidable)

The operation of repowered turbines in the Patterson Pass project area would be expected to result in a reduction in estimated avian fatality rate in comparison with the fatality estimates from nonrepowered turbines. However, as discussed above in Impact BIO-11a-1 and 11a-2, repowering would not eliminate avian turbine-related fatalities, considerable uncertainty surrounding the comparative dataset remains, and fatalities from turbine collision would still result in a significant and unavoidable impact. The estimated reduction in annual fatalities differs by species and species group. These reductions are presented in Table 3.4-13 and summarized below.

Table 3.4-14. Estimated Annual Avian Fatalities for Existing and Repowered Patterson Pass Project Area

	Estimated Annual Fatalities for Program Area						
	Nonrepowered	Repowered					
		Diablo Winds[a]		Buena Vista[b]		Vasco Winds[c,d]	
Species	Average Annual Fatalities	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease
American kestrel	12.9	1.8	86	3.0	77	5.9	54
Barn owl	5.2	0.4	92	–	–	0.7	87
Burrowing owl	16.9	16.6	2	0.0	100	1.0	94
Golden eagle	1.8	0.2	89	0.8	56	0.6	67
Loggerhead shrike	4.1	0.0	100	0.0	100	0.0	100
Prairie falcon	0.4	0.0	100	0.0	100	0.0	100
Red-tailed hawk	9.6	4.0	59	2.0	79	4.9	49
Swainson's hawk	0.0	0.0	0.0	0.0	0	0.0	0
All raptors	53.1	24.0	55	6.1	88	12.7	76
All native non-raptors	98.4	49.7	49	20.0	80	41.5	58

Note: fatality rates reflect annual fatalities (95% confidence interval).

[a] Diablo Winds fatality rates extrapolated to the Patterson Pass project area.

[b] Buena Vista fatality rates extrapolated to the Patterson Pass project area.

[c] Vasco Winds fatality rates extrapolated to the Patterson Pass project area.

[d] Vasco Winds fatality rate for golden eagle based on updated information received from NextEra Energy Resources on July 21, 2014 and extrapolated to the Patterson Pass project area.

American Kestrel. As shown in Table 3.4-14, the repowered 19.8 MW Patterson Pass project would be expected to result in an estimated two to six American kestrel fatalities per year—a 54–86% decrease.

Barn Owl. As shown in Table 3.4-14, the repowered 19.8 MW Patterson Pass project would be expected to result in less than one barn owl fatality per year—an 87–92% decrease.

Burrowing Owl. As shown in Table 3.4-14, the repowered 19.8 MW Patterson Pass project would be expected to result in an estimated 1–17 burrowing owl fatalities per year—a 2–94% decrease in fatalities. This fatality estimate is based on data from Diablo Winds and Vasco Winds; no burrowing owl fatalities were detected at Buena Vista.

However, a growing body of circumstantial evidence indicates that many of the burrowing of fatalities found during fatality surveys are due to predation rather than turbine collision. Because of this confounding effect, the potential reduction in turbine-related burrowing owl fatalities may be underestimated because of the inability to distinguish fatalities resulting from predation from those caused by turbine collision.

Golden Eagle. As shown in Table 3.4-14, the repowered 19.8 MW Patterson Pass project would be expected to result in less than one golden eagle fatality per year—a 56–89% decrease.

Loggerhead Shrike. No documented fatalities of loggerhead shrikes have occurred at the Diablo Winds, Buena Vista, or Vasco Winds projects (Table 3.4-14), although loggerhead shrikes are regularly detected in the vicinity of the Diablo Winds turbines. The lack of documented fatalities suggests that there may be a reduced level of fatality from the repowered turbines at the Pattern Pass project site.

Prairie Falcon. Fatality estimates at repowered sites are not available for prairie falcon because no fatalities have been documented at Diablo Winds or Vasco Winds and only one fatality has been recorded at Buena Vista (Table 3.4-14). Therefore, it is difficult to estimate the annual fatalities that would result from the repowered Patterson Pass project. The lack of documented fatalities suggests that there may be a reduced level of fatality from the repowered turbines at the Patterson Pass project site. However, the nonrepowered fatality rate for prairie falcon is already relatively low (0.02 fatality/MW/year), suggesting that the collision risk for this species is low. Prairie falcon occurs mostly in winter, and the baseline fatality rate is measured during a period when the seasonal shutdown has been in effect. Repowered turbines do not shut down in winter.

Red-Tailed Hawk. As shown in Table 3.4-14, the repowered 19.8 MW Patterson Pass project would be expected to result in an estimated two to five red-tailed hawk fatalities per year—a 49–79% decrease.

Swainson's Hawk. There is only one recorded Swainson's hawk fatality in the APWRA, resulting in an annual estimated fatality rate of approximately zero (Table 3.4-14). No Swainson's hawk fatalities were detected at Diablo Winds, Buena Vista, or Vasco Winds. Based on the low estimated fatality rate from nonrepowered sites and the lack of fatalities detected at repowered sites, it is expected that the fatality rate for Swainson's hawk would remain low at the repowered Patterson Pass project site.

Raptors. As shown in Table 3.4-14, the repowered 19.8 MW Patterson Pass project would be expected to result in an estimated 6–24 raptor fatalities per year—a 55–88% decrease.

Native non-raptors. As shown in Table 3.4-14, the repowered 19.8 MW Patterson Pass project would be expected to result in an estimated 20–50 native non-raptor fatalities per year—a 49–80% decrease.

As described above, for all avian focal species analyzed, the repowered Patterson Pass project would be expected to reduce estimated fatality rates. However, fatalities would still be expected to result from the operation of the repowered turbines, and uncertainty surrounding the accuracy of the estimated fatality rates and the types of species potentially affected remains. Considering this information, and despite the anticipated reductions in avian impacts compared to the baseline rates, the County has determined to use a conservative approach for the impact assessment, concluding that turbine-related fatalities could constitute a substantial adverse effect on avian species because the rates for some or all of the species could be greater than the baseline rates. This impact would be significant. Implementation of the mitigation measures listed below would reduce this impact but not to a less-than-significant level; accordingly, this impact is considered significant and unavoidable. Implementation of Mitigation Measures BIO-11a through BIO-11i would reduce this impact but not to a less-than-significant level; accordingly, this impact is considered significant and unavoidable.

Mitigation Measure BIO-11a: Prepare a project-specific avian protection plan

Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds

Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts

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

Mitigation Measure BIO-11e: Retrofit existing infrastructure to minimize risk to raptors

Mitigation Measure BIO-11f: Discourage prey for raptors

Mitigation Measure BIO-11g: Implement postconstruction avian fatality monitoring for all repowering projects and implement adaptive management measures as necessary

Mitigation Measure BIO-11h: Compensate for the loss of raptors and other avian species, including golden eagles, by contributing to conservation efforts

Mitigation Measure BIO-11i: Implement an avian adaptive management program

Impact BIO-12a-1: Potential mortality or disturbance of bats from roost removal or disturbance—program Alternative 1: 417 MW (less than significant with mitigation)

Several species of both common (*Myotis* spp.) and special-status (western red bat, pallid bat, Townsend's big-eared bat) bats are known to occur or could occur in or around the program area, and could use the area for foraging, dispersal, and migration. Bats may use rock outcrops, trees, buildings, bridges, and other structures in the program area as maternity or migratory stopover roosts. Permanent water bodies and stock tanks in and adjacent to the program area provide sources of fresh water for both resident and migratory bats.

Construction and decommissioning of turbines could result in disturbance or loss of active bat roosts through increased traffic, noise, lighting, and human access. Removal or disturbance of trees, rock outcrops, debris piles, outbuildings, or other artificial structures could result in removal of roost habitat and mortality of bats using the structure as a roost. Several species of bat are sensitive to disturbance and may abandon flightless young, or they may simply not return to the roost once disturbed, resulting in the loss of that roost as habitat for the local population. Because some bats roost colonially, removal of special-status species' roost structures in a roost-limited habitat could result in the loss of a significant portion of the local bat population. This would be a significant impact. Implementation of Mitigation Measures BIO-1b, BIO-3, BIO-12a, and BIO-12b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-12a: Conduct bat roost surveys

Prior to development of any repowering project, a qualified bat biologist will conduct a roost habitat assessment to identify potential colonial roost sites of special-status and common bat species within 750 feet of the construction area. If suitable roost sites are to be removed or otherwise affected by the proposed project, the bat biologist will conduct targeted roost surveys of all identified sites that would be affected. Because bat activity is highly variable (both spatially and temporally) across the landscape and may move unpredictably among several roosts, several separate survey visits may be required. Surveys will be repeated at different times of year if deemed necessary by the bat biologist to determine the presence of seasonally active roosts (hibernacula, migratory stopovers, maternity roosts).Appropriate field methods will be employed to determine the species, type, and vulnerability of the roost to construction disturbance. Methods will follow best practices for roost surveys such that species are not disturbed and adequate temporal and spatial coverage is provided to increase likelihood of detection.

Roost surveys may consist of both daylight surveys for signs of bat use and evening/night visit(s) to conduct emergence surveys or evaluate the status of night roosts. Survey timing should be adequate to account for individual bats or species that might not emerge until well after dark.

Methods and approaches for determining roost occupancy status should include a combination of the following components as the biologist deems necessary for the particular roost site.

- Passive and/or active acoustic monitoring to assist with species identification.
- Guano traps to determine activity status.
- Night-vision equipment.
- Passive infrared camera traps.

At the completion of the roost surveys, a report will be prepared documenting areas surveyed, methods, results, and mapping of high-quality habitat or confirmed roost locations.

Mitigation Measure BIO-12b: Avoid removing or disturbing bat roosts

- Active bat roosts will not be disturbed, and will be provided a minimum buffer of 500 feet where preexisting disturbance is moderate or 750 feet where preexisting disturbance is minimal. Confirmation of buffer distances and determination of the need for a biological monitor for active maternity roosts or hibernacula will be obtained in consultation with CDFW. At a minimum, when an active maternity roost or hibernaculum is present within 750 feet of a construction site, a qualified biologist will conduct an initial assessment of the roost response to construction activities and will recommend buffer expansion if there are signs of disturbance from the roost.
- Structures (natural or artificial) showing evidence of significant bat use within the past year will be left in place as habitat wherever feasible. Should such a structure need to be removed or disturbed, CDFW will be consulted to determine appropriate buffers, timing and methods, and compensatory mitigation for the loss of the roost.
- All project proponents will provide environmental awareness training to construction personnel, establish buffers, and initiate consultation with CDFW if needed.
- Artificial night lighting within 500 feet of any roost will be shielded and angled such that bats may enter and exit the roost without artificial illumination and the roost does not receive artificial exposure to visual predators.
- Tree and vegetation removal will be conducted outside the maternity season (April 1–September 15) to avoid disturbance of maternity groups of foliage-roosting bats.

- If a maternity roost or hibernaculum is present within 500 feet of the construction site where preexisting disturbance is moderate or within 750 feet where preexisting disturbance is minimal, a qualified biological monitor will be onsite during groundbreaking activities.

Impact BIO-12a-2: Potential mortality or disturbance of bats from roost removal or disturbance—program Alternative 2: 450 MW (less than significant with mitigation)

Several species of both common (*Myotis* spp.) and special-status (western red bat, pallid bat, Townsend's big-eared bat) bats are known to occur or could occur in or around the program area, and could use the area for foraging, dispersal, and migration. Bats may use rock outcrops, trees, buildings, bridges, and other structures in the program area as maternity or migratory stopover roosts. Permanent water bodies and stock tanks in and adjacent to the program area provide sources of fresh water for both resident and migratory bats.

Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Construction and decommissioning of turbines could result in disturbance or loss of active bat roosts through increased traffic, noise, lighting, and human access. Removal or disturbance of trees, rock outcrops, debris piles, outbuildings, or other artificial structures could result in removal of roost habitat and mortality of bats using the structure as a roost. Several species of bat are sensitive to disturbance and may abandon flightless young, or they may simply not return to the roost once disturbed, resulting in the loss of that roost as habitat for the local population. Because some bats roost colonially, removal of special-status species' roost structures in a roost-limited habitat could result in the loss of a significant portion of the local bat population. This would be a significant impact. Implementation of Mitigation Measures BIO-1b, BIO-3, BIO-12a, and BIO-12b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-12a: Conduct bat roost surveys

Mitigation Measure BIO-12b: Avoid removing or disturbing bat roosts

Impact BIO-12b: Potential mortality or disturbance of bats from roost removal or disturbance—Golden Hills Project (less than significant with mitigation)

Construction and decommissioning of turbines could result in disturbance or loss of active bat roosts through increased traffic, noise, lighting or human access. Removal or disturbance of trees, rock outcrops, debris piles, outbuildings, or other artificial structures could result in removal of roost habitat and mortality of bats using the structure as a roost. Several species of bat are sensitive to disturbance and may abandon flightless young, or they may simply not return to the roost once disturbed, resulting in the loss of that roost as habitat for the local population. Because some bats roost colonially, removal of special-status species' roost structures in a roost-limited habitat could result in the loss of a significant portion of the local bat population. This would be a significant impact. Implementation of Mitigation Measures BIO-1b, BIO-3, BIO-12a and BIO-12b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-12a: Conduct bat roost surveys

Mitigation Measure BIO-12b: Avoid removing or disturbing bat roosts

Impact BIO-12c: Potential mortality or disturbance of bats from roost removal or disturbance—Patterson Pass Project (less than significant with mitigation)

Construction and decommissioning of turbines could result in disturbance or loss of active bat roosts through increased traffic, noise, lighting or human access. Removal or disturbance of trees, rock outcrops, debris piles, outbuildings, or other artificial structures could result in removal of roost habitat and mortality of bats using the structure as a roost. Several species of bat are sensitive to disturbance and may abandon flightless young, or they may simply not return to the roost once disturbed, resulting in the loss of that roost as habitat for the local population. Because some bats roost colonially, removal of special-status species' roost structures in a roost-limited habitat could result in the loss of a significant portion of the local bat population. This would be a significant impact. Implementation of Mitigation Measures BIO-1b, BIO-3, BIO-12a and BIO-12b would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-12a: Conduct bat roost surveys

Mitigation Measure BIO-12b: Avoid removing or disturbing bat roosts

Impact BIO-13a-1: Potential for construction activities to temporarily remove or alter bat foraging habitat—program Alternative 1: 417 MW (less than significant)

Construction of repowering projects could degrade bat foraging habitat by replacing vegetation with nonvegetated land cover types. Project construction would create a temporary increase in traffic, noise, and artificial night lighting in the program area, reducing the extent of landscape available for foraging. However, the amount of landscape returned to foraging habitat in the process of decommissioning the first- and second-generation turbines would offset the amount of foraging habitat lost to repowering activities. This impact would be less than significant. No mitigation is required.

Impact BIO-13a-2: Potential for construction activities to temporarily remove or alter bat foraging habitat—program Alternative 2: 450 MW (less than significant)

Construction of repowering projects could degrade bat foraging habitat by replacing vegetation with nonvegetated land cover types. Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Project construction would create a temporary increase in traffic, noise, and artificial night lighting in the program area, reducing the extent of landscape available for foraging. However, the amount of landscape returned to foraging habitat in the process of decommissioning the first- and second-generation turbines would offset the amount of foraging habitat lost to repowering activities. This impact would be less than significant. No mitigation is required.

Impact BIO-13b: Potential for construction activities to temporarily remove or alter bat foraging habitat—Golden Hills Project (less than significant)

Construction of the Golden Hills Project could degrade bat foraging habitat by replacing vegetation with nonvegetated land cover types. Project construction would create a temporary increase in traffic, noise, and artificial night lighting in the program area, reducing the extent of landscape available for foraging. However, the amount of landscape returned to foraging habitat in the process of decommissioning the first- and second-generation turbines would offset the amount of foraging habitat lost to repowering activities. This impact would be less than significant. No mitigation is required.

Impact BIO-13c: Potential for construction activities to temporarily remove or alter bat foraging habitat—Patterson Pass Project (less than significant)

Construction of the Patterson Pass Project could degrade bat foraging habitat by replacing vegetation with nonvegetated land cover types. Project construction would create a temporary increase in traffic, noise, and artificial night lighting in the program area, reducing the extent of landscape available for foraging. However, the amount of landscape returned to foraging habitat in the process of decommissioning the first- and second-generation turbines would offset the amount of foraging habitat lost to repowering activities. This impact would be less than significant. No mitigation is required.

Impact BIO-14a-1: Turbine-related fatalities of special-status and other bats—program Alternative 1: 417 MW (significant and unavoidable)

Resident and migratory bats flying in and through the program area may be killed by collision with wind turbine blades or other interaction with the wind turbine generators.

Insufficient data are currently available to develop accurate fatality estimates for individual bat species. Five bat species have been documented in fatality monitoring programs in the APWRA (Insignia Environmental 2012:48; Brown et al. 2013: 23; ICF International 2012:3-3), of which two (western red bat and hoary bat) are special-status species. Extrapolating from existing fatality data and from trends observed at other wind energy facilities where fourth-generation turbines are in operation, it appears likely that fatalities would occur predominantly in the late summer to mid-fall migration period; that fatalities would consist mostly of migratory bats, particularly Mexican free-tailed bat and hoary bat; that fatalities would occur sporadically at other times of year; and that fatalities of one or more other species would occur in smaller numbers.

Diablo Winds, Buena Vista, and Vasco Winds are the only repowered projects in the APWRA for which estimates of bat fatality rates are available. While these rates vary widely (Smallwood and Karas 2009:1067; Insignia Environmental 2012:65; Brown et al. 2013:39), based on these estimates, bat collision risk increases substantially when old-generation turbines are replaced by newer, larger turbines (Smallwood and Karas 2009:1068). Turbines used in future repowering projects are likely to be similar in size to the Vasco Winds turbines but much larger than the Diablo Winds and Buena Vista turbines in both overall size and rated nameplate capacity. There is evidence to suggest that larger turbines similar to those used in the Vasco Winds project will result in additional increases in bat fatality rates for those bat species currently killed in the APWRA.

Some hypotheses for the increased collision risk to migratory bat species at fourth-generation turbines are summarized below.

- Bats tend not to fly at high wind speeds. The lower wind speeds at which fourth-generation turbines are able to produce power create more overlap in the time that turbines are operating and bats are in the air. In several studies, the majority of fatalities occurred on nights of lower wind speed (less than 5.5 meters/second [m/s]) (Arnett et al. 2008:73; Good et al. 2012:iv). This correlation suggests a possible source for the increased risk that fourth-generation turbines pose to bats.
- Migratory tree-roosting bats may be attracted to the tubular tower structure of newer turbines; this attraction may be related to mating behavior during migration (Arnett et al. 2008:73; Cryan 2008:1).
- Echolocation pulses may not be used during open-air migratory flight, or not used as often, resulting in bats being unaware of the hazard presented by the turbine blades (Kunz et al. 2007:319).
- Foraging, water acquisition, roost selection, or mating behavior during migration season may bring bats through the rotor-swept area of taller turbines more often (Cryan and Barclay 2009:1333).
- Taller turbines have been documented to kill more bats. The increased height of fourth-generation turbines puts the rotor-swept area into bat flight paths (Barclay et al 2007: 384).

Table 3.4-15 provides a comparison of the estimated number of fatalities expected to occur if old-generation turbines are allowed to continue operating at their current level and the estimated number of fatalities expected to occur after repowering of the program area and the two project areas. Due to the high degree of uncertainty in bat fatality estimates, a range of estimates based on available data is presented. The lowest estimate is derived from the *best estimate* rate of 1.679 fatalities/MW/year reported for the first year of monitoring at the Vasco Winds repowering project (Brown et al. 2013:39). The upper end of this range is calculated using the bat fatality rate of 3.92 fatalities/MW/year reported for the Shiloh I project in the Montezuma Hills Wind Resource Area. The baseline estimate is derived from the bat fatality rate of 0.263 fatalities/MW/year reported for the APWRA for 2005–2007 (Smallwood and Karas 2009:1066). As shown in Table 3.4-15, annual estimated bat fatalities in the program area from implementation of Alternative 1 are anticipated to increase from the current estimate of 87 to 700–1,635 fatalities.

Table 3.4-15. Estimated Range of Annual Bat Fatalities

Study Area	Capacity (MW)	Baseline Fatalities[a]	Predicted Fatalities[b]
Existing program area	329	87	–
Program Alternative 1	417	110	700–1,635
Program Alternative 2	450	118	756–1,764
Golden Hills	88.4	23	148–347
Patterson Pass	19.8	5	33–78

[a] Estimate of total baseline fatalities are based on the Smallwood and Karas fatality rate of 0.263 fatalities/MW/year derived from 2005–2007 monitoring at the APWRA.

[b] Estimate of total predicted fatalities are based on fatality rates from the Vasco Winds repowering project (1.679 fatalities/MW/year), and from the multiyear average rates from the Shiloh I project in the Montezuma Hills WRA (3.92 fatalities/MW/year).

Despite the high level of uncertainty in estimates of bat fatality rates, all available data suggest that repowering would result in a substantial increase in bat fatalities. The degree of increase may be influenced by the following factors.

- Turbine placement in areas of high autumn bat activity or along migration routes.
- Turbine placement along commuting flyways to key resources (e.g., roosts, water, foraging habitat).
- Behavior of the turbine model before it cuts in (i.e., whether blades are allowed to spin at lower wind speeds) (Good et al. 2012:v).

Mitigation Measures BIO-14a through BIO-14e would reduce this impact, but not to a less-than-significant level; accordingly, this impact is considered significant and unavoidable.

Mitigation Measure BIO-14a: Site and select turbines to minimize potential mortality of bats

All project proponents will use the best information available to site turbines and to select from turbine models in such a manner as to reduce bat collision risk. The siting and selection process will take into account bat use of the area and landscape features known to increase collision risk (trees, edge habitats, riparian areas, water bodies, and wetlands). Measures include but are not limited to siting turbines the greatest distance feasible up to 500 meters (1,640) feet from still or flowing bodies of water, riparian habitat, known roosts, and tree stands (California Bat Working Group 2006:6).

To generate site-specific “best information” to inform turbine siting and operation decisions, a bat habitat assessment and roost survey will be conducted in the project area to identify and map habitat of potential significance to bats, such as potential roost sites (trees and shrubs, significant rock formations, artificial structures) and water sources. Turbine siting decisions will incorporate relevant bat use survey data and bat fatality records published by other projects in the APWRA. Roost surveys will be carried out according to the methods described in Mitigation Measure-BIO-12a.

Mitigation Measure BIO-14b: Implement postconstruction bat fatality monitoring program for all repowering projects

A scientifically defensible, postconstruction bat fatality monitoring program will be implemented to estimate actual bat fatalities and determine if additional mitigation is required. Bat-specific modifications to the 3-year postconstruction monitoring program described in Mitigation Measure BIO-11g, developed in accordance with CEC 2007 and with appropriate recommendations from California Bat Working Group guidelines (2006), will be implemented.

In addition to the requirements outlined in Mitigation Measure BIO-11g, the following two bat-specific requirements will be added.

- Include on the TAC at least one biologist with significant expertise in bat research and wind energy impacts on bats.
- Conduct bat acoustic surveys concurrently with fatality monitoring in the project area to estimate nightly, seasonal, or annual variations in relative activity and species use patterns, and to contribute to the body of knowledge on seasonal bat movements and relationships between bat activity, environmental variables, and turbine fatality. Should emerging research support the approach, these data may be used to generate site-specific predictive models to increase the precision and effectiveness of mitigation measures (e.g., the season-specific, multivariate models described by Weller and Baldwin 2011:11). Acoustic bat surveys will be designed and data analysis conducted by qualified biologists with significant experience in acoustic bat survey techniques. Methods will be informed by the latest available guidelines (California Energy Commission guidelines, 2007); California Bat Working Group guidelines, 2006), except where best available science supports technological or methodological updates. High-quality, sensitive acoustic equipment will be used to produce data of sufficient quality to generate species identifications. Survey design and methods will be scientifically defensible and will include, at a minimum, the following elements.
  - Acoustic detectors will be installed at multiple stations to adequately sample range of habitats in the project area for both resident and migratory bats. The number of detector arrays installed per project site will incorporate emerging research on the density of detectors required to adequately meet sampling goals and inform mitigation approaches (Weller and Baldwin 2011:10).
  - Acoustic detector arrays will sample multiple airspace heights including as close to the repowered rotor swept area as possible Vertical structures used for mounting may be preexisting or may be installed for the project (e.g., temporary or permanent meteorological towers).
  - Surveys will be conducted such that data are collected continuously from early July to early November to cover the activity transition from maternity to migration season and determine if there is elevated activity during migration. Survey season may be adjusted to more accurately reflect the full extent of the local migration season and/or season(s) of greatest local bat fatality risk, if scientifically sound data support doing so.
  - Anticipated adaptive management goals, such as determining justifiable timeframes to reduce required periods of cut-in speed adjustments, will be reviewed with the TAC and incorporated in designing the acoustic monitoring and data analysis program.

Modifications to the fatality search protocol will be implemented to obtain better information on the number and timing of bat fatalities (e.g., Johnston et al. 2013:85). Modifications will include decreases in the transect width and search interval for a period of time coinciding with high levels of bat mortality, i.e., the fall migration season (roughly August to early November, or as appropriate in the view of the TAC). The nature of bat-specific transect distance and search intervals will be determined in consultation with the TAC and will be guided by scientifically sound and pertinent data on rates of bat carcass detection at wind energy facilities (e.g., Johnston et al. 2013:54–55) and site-specific data from APWRA repowering project fatality monitoring programs as these data become available.

Other methods to achieve the goals of the bat fatality monitoring program while avoiding prohibitive costs may be considered subject to approval by the TAC, if these methods have been peer reviewed and evidence indicates the methods are effective. For example, if project proponents wish to have the option of altering search methodology to a newly developed method, such as searching only roads and pads (Good et al. 2011:73), a statistically robust field study to index the results of the methodology against standard search methods will be conducted concurrently to ensure site-specific, long-term validity of the new methods.

Finally, detection probability trials will utilize bat carcasses to develop bat-specific detection probabilities. Care should be taken to avoid introducing novel disease reservoirs; such avoidance will entail using onsite fatalities or using carcasses obtained from within a reasonably anticipated flight distance for that species.

Mitigation Measure BIO-14c: Prepare and publish annual monitoring reports on the findings of bat use of the project area and fatality monitoring results

Annual reports of bat use results and fatality monitoring will be produced within 3 months of the end of the last day of fatality monitoring. Special-status bat species records will be reported to CNDDB.

Mitigation Measure BIO-14d: Develop and implement a bat adaptive management plan

In concert with Mitigation Measure BIO-14b, all project proponents will develop adaptive management plans to ensure appropriate, feasible, and current incorporation of emerging information. The goals of the adaptive management plans are to ensure that the best available science and emerging technologies are used to assess impacts on bats, and that impacts are minimized to the greatest extent possible while maximizing energy production.

The project-specific adaptive management plans will be used to adjust operation and mitigation to incorporate the results of project area monitoring and new technology and research results when sufficient evidence exists to support these new approaches. These plans will be reviewed by the TAC and approved by the County. All adaptive management measures will be implemented within a reasonable timeframe, sufficient to allow the measures to take effect in the first fall migration season following the year of monitoring in which the adaptive management threshold was crossed. ADMMs may be modified by the County in consultation with the TAC to take into account current research, site-specific data, and the most effective impact reduction strategies. ADMMs will include a scientifically defensible, controlled research component and minimum post-implementation monitoring time to evaluate the effectiveness and validity of the measures. The minimum monitoring time will consist of three sequential fall seasons of the bat-specific mortality monitoring program covering the 3–4 months of the year in which the highest bat mortality has been observed: likely August–November. The start and end dates of the 3–4 months of bat-specific mortality monitoring period will be based on existing fatality data and in consultation with the TAC.

Determining a fatality threshold to trigger adaptive management is not straightforward, as insufficient information exists on the status and vitality of the populations of migratory bat species subject to mortality in the APWRA. The low estimate of anticipated bat fatality rates is from the Vasco Winds project in the APWRA. Applying this rate programmatically would result in an estimate of 21,000 bats killed over the 30-year life of the program. The high estimate is from the Montezuma Hills Wind Resource Area. Applying this rate programmatically would result in an estimate of 49,050 bats killed over the 30-year life of the program. Bats are slow to reproduce, and turbines may be more likely to kill adult bats than juveniles, suggesting that a conservative approach is warranted. Accordingly, an initial adaptive management threshold will be established using the low fatality estimates, or 1.679 fatalities/MW/year, to ensure that the most conservative trigger for implementation of adaptive management measures is adopted.

If postconstruction fatality monitoring results in a point estimate for the bat fatality rate that exceeds the 1.679 fatalities/MW/year threshold by a statistically significant amount, then, in consultation with the TAC, ADMM-7 and ADMM-8 (described below) for bats will be implemented.

It is important to note that neither the high nor the low estimate speaks to the ability of bat populations to withstand the associated levels of take. The initial fatality rate threshold triggering adaptive management may be modified by the TAC if appropriate and if such adaptation is supported by the best available science.

The TAC may direct implementation of adaptive management measures for other appropriate reasons, such as an unexpectedly and markedly high fatality rate observed for any bat species, or special-status species being killed in unexpectedly high numbers.

ADMMs for bats may be implemented using a stepped approach until necessary fatality reductions are reached, and monitoring methods must be revised as needed to ensure accurate measurement of the effectiveness of the ADMMs. Additional ADMMs for bats should be developed as new technologies or science supports doing so.

ADMM-7: Seasonal Turbine Cut-in Speed Increase. Cut-in speed increases offer the most promising and immediately available approach to reducing bat fatalities at fourth-generation wind turbines. Reductions in fatalities (53–87%) were observed when increasing modern turbine cut-in speed to 5.0–6.5 m/s (Arnett et al. 2009:3; Good et al. 2012:iii). While implementing this measure immediately upon a project's commencement would likely reduce bat fatalities, that assumption is not yet supported by conclusive data. Moreover, without establishing baseline fatality at repowered projects, there would be no way to determine the effectiveness of the approach or whether the costs of increased cut-in speeds (and consequent power generation reductions) were providing fatality reductions.

Cut-in speed increases will be implemented as outlined below, with effectiveness assessed annually.

- The project proponent will increase cut-in speed to 5.0 m/s from sunset to sunrise during peak migration season (generally August–October). If this is ineffective, the project proponent will increase turbine cut-in speed by annual increments of 0.5 m/s until target fatality reductions are achieved.

- The project proponent may refine site-specific migration start dates on the basis of pre- and postconstruction acoustic surveys and ongoing review of dates of fatality occurrences for migratory bats in the APWRA.
- The project proponent may request a shorter season of required cut-in speed increases with substantial evidence that similar levels of mortality reduction could be achieved. Should resource agencies and the TAC find there is sufficient support for a shorter period (as low as 8 weeks), evidence in support of this shorter period will be documented for the public record and the shorter period may be implemented.
- The project proponent may request shorter nightly periods of cut-in speed increases with substantial evidence from defensible onsite, long-term postconstruction acoustic surveys indicating predictable nightly timeframes when target species appear not to be active. Target species are here defined as migratory bats or any other species appearing repeatedly in the fatality records.
- The project proponent may request exceptions to cut-in speed increases for particular weather events or wind patterns if substantial evidence is available from onsite acoustic or other monitoring to support such exceptions (i.e., all available literature and onsite surveys indicate that bat activity ceases during specific weather events or other predictable conditions).
- In the absence of defensible site-specific data, mandatory cut-in speed increases will commence on August 1 and continue through October 31, and will be in effect from sunset to sunrise.

ADMM-8: Emerging Technology as Mitigation. The project proponent may request, with consultation and approval from agencies, replacement or augmentation of cut-in speed increases with developing technology or another mitigation approach that has been proven to achieve similar bat fatality reductions.

The project proponent may also request the second tier of adaptive management to be the adoption of a promising but not fully proven technology or mitigation method. These requests are subject to review and approval by the TAC and must include a controlled research component designed by a qualified principal investigator so that the effectiveness of the method may be accurately assessed.

Some examples of such emerging technologies and research areas that could be incorporated in adaptive management plans are listed below.

- The use of acoustic deterrents (Arnett et al. 2013:1).
- The use of altitude-specific radar, night vision and/or other technology allowing bat use monitoring and assessment of at-risk bat behavior (Johnston et al. 2013: 90-91) if research in these areas advances sufficiently to allow effective application of these technologies.
- Application of emerging peer-reviewed studies on bat biology (such as studies documenting migratory corridors or bat behavior in relation to turbines) that support specific mitigation methods.

Mitigation Measure BIO-14e: Compensate for expenses incurred by rehabilitating injured bats

The cost of reasonable, licensed rehabilitation efforts for any injured bats taken to wildlife care facilities from the program area will be assumed in full by project proponents.

Impact BIO-14a-2: Turbine-related fatalities of special-status and other bats—program Alternative 2: 450 MW (significant and unavoidable)

Resident and migratory bats flying in and through the program area may be killed by collision with wind turbine blades or other interaction with the wind turbine generators.

Insufficient data are currently available to develop accurate fatality estimates for individual bat species. Five bat species have been documented in fatality monitoring programs in the APWRA (Insignia Environmental 2012:48; Brown et al. 2013: 23; ICF International 2012:3-3), of which two (western red bat and hoary bat) are special-status species. Extrapolating from existing fatality data and from trends observed at other wind energy facilities where fourth-generation turbines are in operation, it appears likely that fatalities would occur predominantly in the late summer to mid-fall migration period; that fatalities would consist mostly of migratory bats, particularly Mexican free-tailed bat and hoary bat; that fatalities would occur sporadically at other times of year; and that fatalities of one or more other species would occur in smaller numbers.

Diablo Winds, Buena Vista, and Vasco Winds are the only repowered projects in the APWRA for which estimates of bat fatality rates are available. While these rates vary widely (Smallwood and Karas 2009:1067; Insignia Environmental 2012:65; Brown et al. 2013:39), based on these estimates, bat collision risk increases substantially when old-generation turbines are replaced by newer, larger turbines (Smallwood and Karas 2009:1068). Turbines used in future repowering projects are likely to be similar in size to the Vasco Winds turbines but much larger than the Diablo Winds and Buena Vista turbines in both overall size and rated nameplate capacity. There is evidence to suggest that larger turbines similar to those used in the Vasco Winds project will result in additional increases in bat fatality rates for those bat species currently killed in the APWRA.

Some hypotheses for the increased collision risk to migratory bat species at fourth-generation turbines are summarized below.

- Bats tend not to fly at high wind speeds. The lower wind speeds at which fourth-generation turbines are able to produce power create more overlap in the time that turbines are operating and bats are in the air. In several studies, the majority of fatalities occurred on nights of lower wind speed (less than 5.5 meters/second [m/s]) (Arnett et al. 2008:73; Good et al. 2012:iv). This correlation suggests a possible source for the increased risk that fourth-generation turbines pose to bats.
- Migratory tree-roosting bats may be attracted to the tubular tower structure of newer turbines; this attraction may be related to mating behavior during migration (Arnett et al. 2008:73; Cryan 2008:1).
- Echolocation pulses may not be used during open-air migratory flight, or not used as often, resulting in bats being unaware of the hazard presented by the turbine blades (Kunz et al. 2007:319).

- Foraging, water acquisition, roost selection, or mating behavior during migration season may bring bats through the rotor-swept area of taller turbines more often (Cryan and Barclay 2009:1333).
- Taller turbines have been documented to kill more bats. The increased height of fourth-generation turbines puts the rotor-swept area into bat flight paths (Barclay et al 2007: 384).

Table 3.4-15 provides a comparison of the estimated number of fatalities expected to occur if old-generation turbines are allowed to continue operating at their current level and the estimated number of fatalities expected to occur after repowering of the program area and the two project areas. Due to the high degree of uncertainty in bat fatality estimates, a range of estimates based on available data is presented. The lowest estimate is derived from the *best estimate* rate of 1.679 fatalities/MW/year reported for the first year of monitoring at the Vasco Winds repowering project (Brown et al. 2013:39). The upper end of this range is calculated using the bat fatality rate of 3.92 fatalities/MW/year reported for the Shiloh I project in the Montezuma Hills Wind Resource Area. The baseline estimate is derived from the bat fatality rate of 0.263 fatalities/MW/year reported for the APWRA for 2005–2007 (Smallwood and Karas 2009:1066). As shown in Table 3.4-15, annual estimated bat fatalities in the program area from implementation of Alternative 2 are anticipated to increase from the current estimate of 87 to 756–1,764 fatalities.

Despite the high level of uncertainty in estimates of bat fatality rates, all available data suggest that repowering would result in a substantial increase in bat fatalities. The degree of increase may be influenced by the following factors.

- Turbine placement in areas of high autumn bat activity or along migration routes.
- Turbine placement along commuting flyways to key resources (e.g., roosts, water, foraging habitat).
- Behavior of the turbine model before it cuts in (i.e., whether blades are allowed to spin at lower wind speeds) (Good et al. 2012:v).

Mitigation Measures BIO-14a through BIO-14e would reduce this impact, but not to a less-than-significant level; accordingly, this impact is considered significant and unavoidable.

Mitigation Measure BIO-14a: Site and select turbines to minimize potential mortality of bats

Mitigation Measure BIO-14b: Implement postconstruction bat fatality monitoring program for all repowering projects

Mitigation Measure BIO-14c: Prepare and publish annual monitoring reports on the findings of bat use of the project area and fatality monitoring results

Mitigation Measure BIO-14d: Develop and implement a bat adaptive management plan

Mitigation Measure BIO-14e: Compensate for expenses incurred by rehabilitating injured bats

Impact BIO-14b: Turbine-related fatalities of special-status and other bats—Golden Hills Project (significant and unavoidable)

Resident and migratory bats flying in and through the Golden Hills project area may be killed by collision with wind turbine blades or other interaction with the wind turbine generators. Repowering in the project area would introduce increased fatality risk, particularly to migratory bats.

Extrapolating from existing fatality data and from trends observed at other wind energy facilities where fourth-generation turbines are in operation, it appears likely that fatalities would occur predominantly in the late summer to mid-fall migration period; that fatalities would consist mostly of migratory bats, particularly Mexican free-tailed bat and hoary bat; that fatalities would occur sporadically at other times of year; and that fatalities of one or more other species will occur in smaller numbers. As shown in Table 3.4-14, annual estimated bat fatalities in the Golden Hills project area are anticipated to increase from the current estimate of 23 to 148–347 fatalities. Mitigation Measures BIO-14a through BIO-14e would reduce this impact, but not to a less-than-significant level; accordingly, this impact is considered significant and unavoidable.

Mitigation Measure BIO-14a: Site and select turbines to minimize potential mortality of bats

Mitigation Measure BIO-14b: Implement postconstruction bat fatality monitoring program for all repowering projects

Mitigation Measure BIO-14c: Prepare and publish annual monitoring reports on the findings of bat use of the project area and fatality monitoring results

Mitigation Measure BIO-14d: Develop and implement a bat adaptive management plan

Mitigation Measure BIO-14e: Compensate for expenses incurred by rehabilitating injured bats

Impact BIO-14c: Turbine-related fatalities of special-status and other bats—Patterson Pass Project (significant and unavoidable)

Resident and migratory bats flying in and through the Patterson Pass project area may be killed by collision with wind turbine blades or other interaction with the wind turbine generators. Repowering in the project area would introduce increased fatality risk, particularly to migratory bats.

Extrapolating from existing fatality data and from trends observed at other wind energy facilities where fourth-generation turbines are in operation, it appears likely that fatalities would occur predominantly in the late summer to mid-fall migration period; that fatalities would consist mostly of migratory bats, particularly Mexican free-tailed bat and hoary bat; that fatalities would occur sporadically at other times of year; and that fatalities of one or more other species will occur in smaller numbers. As shown in Table 3.4-14, annual estimated bat fatalities in the Patterson Pass project area are anticipated to increase from the current estimate of 5 to 33–78 fatalities. Mitigation Measures BIO-14a through BIO-14e would reduce this impact, but not to a less-than-significant level; accordingly, this impact is considered significant and unavoidable.

Mitigation Measure BIO-14a: Site and select turbines to minimize potential mortality of bats

Mitigation Measure BIO-14b: Implement postconstruction bat fatality monitoring program for all repowering projects

Mitigation Measure BIO-14c: Prepare and publish annual monitoring reports on the findings of bat use of the project area and fatality monitoring results

Mitigation Measure BIO-14d: Develop and implement a bat adaptive management plan

Mitigation Measure BIO-14e: Compensate for expenses incurred by rehabilitating injured bats

Impact BIO-15a-1: Potential for road infrastructure upgrades to result in adverse effects on alkali meadow—program Alternative 1: 417 MW (less than significant with mitigation)

Road infrastructure upgrades would include grading, widening, and regravelling of existing roads and construction of new roads to accommodate decommission and repowering activities. Culverts would be upgraded for existing roads, and new culverts would be installed for new roads. Direct effects would consist of fill of alkali meadow at locations where roads crossing the habitat would be widened. Indirect effects could involve altered hydrology or runoff of sediment and other substances during road construction activities. Some effects, such as those due to runoff, would be avoided and minimized through implementation of erosion control BMPs and postconstruction reclamation. Installation of new and upgraded culverts would maintain existing hydrology. However, loss of alkali meadow habitat as a result of direct fill would be a substantial adverse effect on a sensitive natural community. This would be a significant impact; however, implementation of Mitigation Measure BIO-15 would reduce this impact to a level less-than-significant level.

Mitigation Measure BIO-15: Compensate for the loss of alkali meadow habitat

If alkali meadow habitat is filled or disturbed as part of a repowering project, the project proponent will compensate for the loss of this habitat to ensure no net loss of habitat functions and values. Compensation ratios will be based on site-specific information and determined through coordination with state and federal agencies (CDFW, USFWS, USACE). Unless specified otherwise by a resource agency, the compensation will 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, offsite restoration, and mitigation credits. A restoration and monitoring plan will be developed and implemented. The plan will describe how alkali meadow habitat will be created and monitored.

Impact BIO-15a-2: Potential for road infrastructure upgrades to result in adverse effects on alkali meadow—program Alternative 2: 450 MW (less than significant with mitigation)

Road infrastructure upgrades would include grading, widening, and regravelling of existing roads and construction of new roads to accommodate decommission and repowering activities. Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Culverts would be upgraded for existing roads, and new culverts would be installed for new roads. Direct effects would consist of fill of alkali meadow at locations where roads crossing the habitat would be widened. Indirect effects could involve altered hydrology or runoff of sediment and other substances during road construction activities. Some effects, such as those due to runoff, would be avoided and minimized through implementation of erosion control BMPs and postconstruction reclamation. Installation of new and upgraded culverts would maintain existing hydrology. However, loss of alkali meadow habitat as a result of direct fill would be a substantial adverse effect on a sensitive natural community. This would be a significant impact; however, implementation of Mitigation Measure BIO-15 would reduce this impact to a level less-than-significant level.

Mitigation Measure BIO-15: Compensate for the loss of alkali meadow habitat

Impact BIO-15b: Potential for road infrastructure upgrades to result in adverse effects on alkali meadow—Golden Hills Project (less than significant with mitigation)

Alkali meadow comprises approximately 3% (145.69 acres) of the Golden Hills project area. Road infrastructure upgrades that could affect this habitat would include grading, widening, and regravelling of existing roads and construction of new roads to accommodate decommission and repowering activities. Culverts would be upgraded for existing roads, and new culverts would be installed for new roads. Direct effects would consist of fill of alkali meadow at locations where roads crossing the habitat would be widened. Indirect effects could involve altered hydrology or runoff of sediment and other substances during road construction activities. Some effects, such as those due to runoff, would be avoided and minimized through implementation of erosion control BMPs and postconstruction reclamation. Installation of new and upgraded culverts would maintain existing hydrology. However, loss of alkali meadow habitat as a result of direct fill would be a substantial adverse effect on a sensitive natural community. Because specific designs have not been developed for the Golden Hills project, it is not possible to quantify this effect. However, if alkali meadow is affected by road infrastructure upgrades, it would be a significant impact. Implementation of Mitigation Measure BIO-15 would reduce this impact to a level less-than-significant level.

Mitigation Measure BIO-15: Compensate for the loss of alkali meadow habitat

Impact BIO-15c: Potential for road infrastructure upgrades to result in adverse effects on alkali meadow—Patterson Pass (no impact)

Because no alkali meadow occurs in the Patterson Pass project area, there would be no impact. No mitigation is required.

Impact BIO-16a-1: Potential for road infrastructure upgrades to result in adverse effects on riparian habitat—program Alternative 1: 417 MW (less than significant with mitigation)

Road infrastructure upgrades would include grading, widening, and regravelling of existing roads and construction of new roads to accommodate decommission and repowering activities. Culverts would be upgraded for existing roads, and new culverts would be installed for new roads. Loss of riparian habitat as a result of direct fill would be a substantial adverse effect on a sensitive natural community. This would be a significant impact; however, implementation of Mitigation Measure BIO-16 would reduce this impact to a level less-than-significant level.

Mitigation Measure BIO-16: Compensate for the loss of riparian habitat

If riparian habitat is filled or removed as part of a project, the project proponent will compensate for the loss of riparian habitat to ensure no net loss of habitat functions and values. Compensation ratios will be based on site-specific information and determined through coordination with state and federal agencies (CDFW, USFWS, USACE). The compensation will 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, offsite restoration, and mitigation credits. A restoration and monitoring plan will be developed and implemented. The plan will describe how riparian habitat will be created and monitored.

Impact BIO-16a-2: Potential for road infrastructure upgrades to result in adverse effects on riparian habitat—program Alternative 2: 450 MW (less than significant with mitigation)

Road infrastructure upgrades would include grading, widening, and regravelling of existing roads and construction of new roads to accommodate decommission and repowering activities. Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Culverts would be upgraded for existing roads, and new culverts would be installed for new roads. Loss of riparian habitat as a result of direct fill would be a substantial adverse effect on a sensitive natural community. This would be a significant impact; however, implementation of Mitigation Measure BIO-16 would reduce this impact to a level less-than-significant level.

Mitigation Measure BIO-16: Compensate for the loss of riparian habitat

Impact BIO-16b: Potential for road infrastructure upgrades to result in adverse effects on riparian habitat—Golden Hills Project (less than significant with mitigation)

Road infrastructure upgrades would include grading, widening, and regravelling of existing roads and construction of new roads to accommodate decommission and repowering activities. Culverts would be upgraded for existing roads, and new culverts would be installed for new roads. Loss of riparian habitat as a result of direct fill would be a substantial adverse effect on a sensitive natural community. Because specific designs have not been developed for the Golden Hills project, it is not possible to quantify this effect. However, if riparian habitat is affected by road infrastructure upgrades, it would be a significant impact. Implementation of Mitigation Measure BIO-16 would reduce this impact to a level less-than-significant level.

Mitigation Measure BIO-16: Compensate for the loss of riparian habitat

Impact BIO-16c: Potential for road infrastructure upgrades to result in adverse effects on riparian habitat—Patterson Pass Project (less than significant with mitigation)

Under current design, no riparian habitat would be affected by road infrastructure upgrades. However, if final design would result in riparian habitat being affected by road infrastructure upgrades, it would be a significant impact. Implementation of Mitigation Measure BIO-16 would reduce this impact to a level less-than-significant level.

Mitigation Measure BIO-16: Compensate for the loss of riparian habitat

Impact BIO-17a-1: Potential for ground-disturbing activities to result in direct adverse effects on common habitats—program Alternative 1: 417 MW (less than significant)

Ground-disturbing activities would result in the permanent loss of common habitats as a result of constructing new permanent facilities and the temporary loss of common habitats as a result of constructing temporary facilities and landscape reclamation. These activities would create minor changes in total acreage of common habitats in the project area, primarily in the annual grassland plant community.

All lands disturbed by infrastructure installation or removal would be returned to preproject conditions. At each reclamation site, the topography would be contour graded (if necessary and if environmentally beneficial), stabilized, and reseeded with an appropriate seed mixture to maintain slope stability. Reclamation activities would be guided by a reclamation plan developed in coordination with the County and other applicable agencies.

This impact would be less than significant. No mitigation is required.

Impact BIO-17a-2: Potential for ground-disturbing activities to result in direct adverse effects on common habitats—program Alternative 2: 450 MW (less than significant)

Ground-disturbing activities would result in the permanent loss of common habitats as a result of constructing new permanent facilities and the temporary loss of common habitats as a result of constructing temporary facilities and landscape reclamation. These activities would create minor changes in total acreage of common habitats in the project area, primarily in the annual grassland plant community.

Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. All lands disturbed by infrastructure installation or removal would be returned to preproject conditions. At each reclamation site, the topography would be contour graded (if necessary and if environmentally beneficial), stabilized, and reseeded with an appropriate seed mixture to maintain slope stability. Reclamation activities would be guided by a reclamation plan developed in coordination with the County and other applicable agencies.

This impact would be less than significant. No mitigation is required.

Impact BIO-17b: Potential for ground-disturbing activities to result in direct adverse effects on common habitats—Golden Hills Project (less than significant)

Ground-disturbing activities would result in the permanent loss of common habitats as a result of constructing new permanent facilities and the temporary loss of common habitats as a result of constructing temporary facilities and landscape reclamation. These activities would create minor changes in total acreage of common habitats in the project area, primarily in the annual grassland plant community.

All lands disturbed by infrastructure installation or removal would be returned to preproject conditions. At each reclamation site, the topography would be contour graded (if necessary and if environmentally beneficial), stabilized, and reseeded with an appropriate seed mixture to maintain slope stability. Reclamation activities would be guided by a reclamation plan developed in coordination with the County and other applicable agencies.

This impact would be less than significant. No mitigation is required.

Impact BIO-17c: Potential for ground-disturbing activities to result in direct adverse effects on common habitats—Patterson Pass Project (less than significant)

Ground-disturbing activities would result in the permanent loss of common habitats as a result of constructing new permanent facilities and the temporary loss of common habitats as a result of constructing temporary facilities and landscape reclamation. These activities would create minor changes in total acreage of common habitats in the project area, primarily in the annual grassland plant community.

All lands disturbed by infrastructure installation or removal would be returned to preproject conditions. At each reclamation site, the topography would be contour graded (if necessary and if environmentally beneficial), stabilized, and reseeded with an appropriate seed mixture to maintain slope stability. Reclamation activities would be guided by a reclamation plan developed in coordination with the County and other applicable agencies.

This impact would be less than significant. No mitigation is required.

Impact BIO-18a-1: Potential for road infrastructure upgrades to result in adverse effects on wetlands—program Alternative 1: 417 MW (less than significant with mitigation)

Road infrastructure upgrades would include grading, widening, and regravelling of the existing roads and construction of new roads. Culverts would be upgraded for existing roads, and new culverts would be installed for new roads. Direct effects would include fill of wetlands at locations where roads crossing the habitat would be widened. Indirect effects could include altered hydrology or runoff of sediment and other substances during road construction activities. Some effects, such as those due to runoff, would be avoided and minimized through the implementation of erosion control BMPs and postconstruction reclamation. Installation of new and upgraded culverts would maintain existing hydrology. However, loss of wetlands as a result of direct fill would be a substantial adverse effect on a sensitive natural community. This would be a significant impact; however, implementation of Mitigation Measure BIO-18 would reduce this impact to a level less-than-significant level.

Mitigation Measure BIO-18: Compensate for the loss of wetlands

If wetlands are filled or disturbed as part of a project, the project proponent will compensate for the loss to ensure no net loss of habitat functions and values. Compensation ratios will be based on site-specific information and determined through coordination with state and federal agencies (CDFW, USFWS, USACE). The compensation will 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, offsite restoration, and mitigation credits. A restoration and monitoring plan will be developed and implemented. The plan will describe how wetlands will be created and monitored.

Impact BIO-18a-2: Potential for road infrastructure upgrades to result in adverse effects on wetlands—program Alternative 2: 450 MW (less than significant with mitigation)

Road infrastructure upgrades would include grading, widening, and regravelling of the existing roads and construction of new roads. Culverts would be upgraded for existing roads, and new culverts would be installed for new roads. Direct effects would include fill of wetlands at locations where roads crossing the habitat would be widened. Indirect effects could include altered hydrology or runoff of sediment and other substances during road construction activities. Some effects, such as those due to runoff, would be avoided and minimized through the implementation of erosion control BMPs and postconstruction reclamation. Installation of new and upgraded culverts would maintain existing hydrology. Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. However, loss of wetlands as a result of direct fill would be a substantial adverse effect on a sensitive natural community. This would be a significant impact; however, implementation of Mitigation Measure BIO-18 would reduce this impact to a level less-than-significant level.

Mitigation Measure BIO-18: Compensate for the loss of wetlands

Impact BIO-18b: Potential for road infrastructure upgrades to result in adverse effects on wetlands—Golden Hills Project (less than significant with mitigation)

Road infrastructure upgrades would include grading, widening, and regravelling of the existing roads and construction of new roads. Culverts would be upgraded for existing roads, and new culverts would be installed for new roads. Direct effects would include fill of wetlands at locations where roads crossing the habitat would be widened. Indirect effects could include altered hydrology or runoff of sediment and other substances during road construction activities. Some effects, such as those due to runoff, would be avoided and minimized through the implementation of erosion control BMPs and postconstruction reclamation. Installation of new and upgraded culverts would maintain existing hydrology. However, loss of wetlands as a result of direct fill would be a substantial adverse effect on a sensitive natural community. This would be a significant impact; however, implementation of Mitigation Measure BIO-18 would reduce this impact to a level less-than-significant level.

Mitigation Measure BIO-18: Compensate for the loss of wetlands

Impact BIO-18c: Potential for road infrastructure upgrades to result in adverse effects on wetlands—Patterson Pass Project (less than significant with mitigation)

Road infrastructure upgrades would include grading, widening, and regravelling of the existing roads and construction of new roads. Culverts would be upgraded for existing roads, and new culverts would be installed for new roads. Direct effects would include fill of wetlands at locations where roads crossing the habitat would be widened. Indirect effects could include altered hydrology or runoff of sediment and other substances during road construction activities. Some effects, such as those due to runoff, would be avoided and minimized through the implementation of erosion control BMPs and postconstruction reclamation. Installation of new and upgraded culverts would maintain existing hydrology. However, loss of wetlands as a result of direct fill would be a substantial adverse effect on a sensitive natural community. This would be a significant impact; however, implementation of Mitigation Measure BIO-18 would reduce this impact to a level less-than-significant level.

Mitigation Measure BIO-18: Compensate for the loss of wetlands

Impact BIO-19a-1: Potential impact on the movement of any native resident or migratory wildlife species or established native resident or migratory wildlife corridors, and the use of native wildlife nursery sites—program Alternative 1: 417 MW (significant and unavoidable)

Many common wildlife species (e.g., ground squirrels, voles, deer, coyote, raccoon, skunk) and special-status wildlife species (e.g., California red-legged frog, Alameda whipsnake, American badger) are likely to occur in and move through the program area. Construction activities associated with the program and fencing of work areas may temporarily impede wildlife movement through the work area or cause animals to travel longer distances to avoid the work area. This could result in higher energy expenditure and increased susceptibility to predation for some species and is a potentially significant impact. Because the construction period for individual projects in the repowering program would be 9 months for a typical 80 MW project, it would likely encompass the movement/migration period for some species (e.g., California tiger salamander movement to/from breeding ponds). In particular, smaller animals, whose energy expenditures to travel around or avoid the area would be greater than for larger animals, could be more severely affected. Upon completion of the program, the new wind turbines would be spaced apart and would not be a barrier to on-the-ground wildlife movement. Additionally, there would be fewer turbines on the ground, and a net increase in the amount of natural area would result from the restoration of decommissioned turbine pads and foundations. This removal of turbines and increase of natural area would partially compensate for this impact. As discussed above for special-status species, the program has the potential to affect native wildlife nursery sites (i.e., breeding areas). Because common species may also use these breeding areas, they may also be affected by the program. This would constitute a significant effect. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3a, BIO-4a, BIO-5a, BIO-5c, BIO-7a, BIO-8a, BIO-8b, and BIO-10a would avoid and minimize potential impacts on wildlife nursery areas for special-status and common wildlife species.

As discussed above, the operation of wind turbines after repowering would adversely affect raptors, other birds, and bats migrating through and wintering in the program area because they could be injured or killed if they fly through the rotor plane of operating wind turbines. As discussed above, this would be a significant and unavoidable impact. Implementation of Mitigation Measures BIO-11b, BIO-11c, BIO-11d, BIO-11e, BIO-11i, BIO-12a, BIO-12b, BIO-14a, and BIO-14d would reduce this impact, but not to a less-than-significant level. Accordingly, this impact would be significant and unavoidable.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle

Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles

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

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

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

Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds

Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts

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

Mitigation Measure BIO-11e: Retrofit existing infrastructure to minimize risk to raptors

Mitigation Measure BIO-11i: Implement an avian adaptive management program

Mitigation Measure BIO-12a: Conduct bat roost surveys

Mitigation Measure BIO-12b: Avoid removing or disturbing bat roosts

Mitigation Measure BIO-14a: Site and select turbines to minimize potential mortality of bats

Mitigation Measure BIO-14d: Develop and implement a bat adaptive management plan

Impact BIO-19a-2: Potential impact on the movement of any native resident or migratory wildlife species or established native resident or migratory wildlife corridors, and the use of native wildlife nursery sites—program Alternative 2: 450 MW (significant and unavoidable)

Effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Many common wildlife species (e.g., ground squirrels, voles, deer, coyote, raccoon, skunk) and special-status wildlife species (e.g., California red-legged frog, Alameda whipsnake, American badger) are likely to occur in and move through the program area. Construction activities associated with the program and fencing of work areas may temporarily impede wildlife movement through the work area or cause animals to travel longer distances to avoid the work area. This could result in higher energy expenditure and increased susceptibility to predation for some species and is a potentially significant impact. Because the construction period for individual projects in the repowering program would be 9 months for a typical 80 MW project, it would likely encompass the movement/migration period for some species (e.g., California tiger salamander movement to/from breeding ponds). In particular, smaller animals, whose energy expenditures to travel around or avoid the area would be greater than for larger animals, could be more severely affected. Upon completion of the program, the new wind turbines would be spaced apart and would not be a barrier to on-the-ground wildlife movement. Additionally, there would be fewer turbines on the ground, and a net increase in the amount of natural area would result from the restoration of decommissioned turbine pads and foundations. This removal of turbines and increase of natural area would partially compensate for this impact. As discussed above for special-status species, the program has the potential to affect native wildlife nursery sites (i.e., breeding areas). Because common species may also use these breeding areas, they may also be affected by the program. This would constitute a significant effect. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3a, BIO-4a, BIO-5a, BIO-5c, BIO-7a, BIO-8a, BIO-8b, and BIO-10a would avoid and minimize potential impacts on wildlife nursery areas for special-status and common wildlife species.

As discussed above, the operation of wind turbines after repowering would adversely affect raptors, other birds, and bats migrating through and wintering in the program area because they could be injured or killed if they fly through the rotor plane of operating wind turbines. As discussed above, this would be a significant and unavoidable impact. Implementation of Mitigation Measures BIO-11b, BIO-11c, BIO-11d, BIO-11e, BIO-11j, BIO-12a, BIO-12b, BIO-14a, and BIO-14d would reduce this impact, but not to a less-than-significant level. Accordingly, this impact would be significant and unavoidable.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle

Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles

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

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

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

Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds

Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts

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

Mitigation Measure BIO-11e: Retrofit existing infrastructure to minimize risk to raptors

Mitigation Measure BIO-11i: Implement an avian adaptive management program

Mitigation Measure BIO-12a: Conduct bat roost surveys

Mitigation Measure BIO-12b: Avoid removing or disturbing bat roosts

Mitigation Measure BIO-14a: Site and select turbines to minimize potential mortality of bats

Mitigation Measure BIO-14d: Develop and implement a bat adaptive management plan

Impact BIO-19b: Potential impact on 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—Golden Hills Project (significant and unavoidable)

Many common wildlife species (e.g., ground squirrels, voles, deer, coyote, raccoon, skunk) and special-status wildlife species (e.g., California red-legged frog, Alameda whipsnake, American badger) are likely to occur in and move through the Golden Hills project area. Construction activities associated with the Golden Hills Project and fencing of work areas may temporarily impede wildlife movement through the work area or cause animals to travel longer distances to avoid the work area. This could result in higher energy expenditure and increased susceptibility to predation for some species and is a potentially significant impact. Because the construction period is anticipated to last 9 months, it would likely encompass the movement/migration period for some species (e.g., California tiger salamander movement to/from breeding ponds). In particular, smaller animals, whose energy expenditures to travel around or avoid the area would be greater than for larger animals, could be more severely affected. Upon completion of project construction, the new wind turbines would be spaced apart and would not be a barrier to on-the-ground wildlife movement. Additionally, there would be fewer turbines on the ground, and a net increase in the amount of natural area would result from the restoration of decommissioned turbine pads and foundations. This removal of turbines and increase of natural area would partially compensate for this impact. As discussed above for special-status species, the Golden Hills Project has the potential to affect native wildlife nursery sites (i.e., breeding areas). Because common species may also use these breeding areas, they may also be affected by the project. This would constitute a significant effect. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3a, BIO-4a, BIO-5a, BIO-5c, BIO-7a, BIO-8a, BIO-8b, and BIO-10a would avoid and minimize potential impacts on wildlife nursery areas for special-status and common wildlife species.

As discussed above, the operation of wind turbines after repowering would adversely affect raptors, other birds, and bats migrating through and wintering in the project area because they could be injured or killed if they fly through the rotor plane of operating wind turbines. This would be a significant and unavoidable impact. Implementation of Mitigation Measures BIO-11b, BIO-11c, BIO-11d, BIO-11e, BIO-11i, BIO-12a, BIO-12b, BIO-14a, and BIO-14d would reduce this impact, but not to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle

Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles

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

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

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

Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds

Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts

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

Mitigation Measure BIO-11e: Retrofit existing infrastructure to minimize risk to raptors

Mitigation Measure BIO-11i: Implement an avian adaptive management program

Mitigation Measure BIO-12a: Conduct bat roost surveys

Mitigation Measure BIO-12b: Avoid removing or disturbing bat roosts

Mitigation Measure BIO-14a: Site and select turbines to minimize potential mortality of bats

Mitigation Measure BIO-14d: Develop and implement a bat adaptive management plan

Impact BIO-19c: Potential impact on 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—Patterson Pass Project (significant and unavoidable)

Many common wildlife species (e.g., ground squirrels, voles, deer, coyote, raccoon, skunk) and special-status wildlife species (e.g., California red-legged frog, Alameda whipsnake, American badger) are likely to occur in and move through the Patterson Pass project area. Construction activities associated with the Patterson Pass Project and fencing of work areas may temporarily impede wildlife movement through the work area or cause animals to travel longer distances to avoid the work area. This could result in higher energy expenditure and increased susceptibility to predation for some species and is a potentially significant impact. Because the construction period is anticipated to last 6–9 months, it would likely encompass the movement/migration period for some species (e.g., California tiger salamander movement to/from breeding ponds). In particular, smaller animals, whose energy expenditures to travel around or avoid the area would be greater than for larger animals, could be more severely affected. Upon completion of project construction, the new wind turbines would be spaced apart and would not be a barrier to on-the-ground wildlife movement. Additionally, there would be fewer turbines on the ground, and a net increase in the amount of natural area would result from the restoration of decommissioned turbine pads and foundations. This removal of turbines and increase of natural area would partially compensate for this impact. As discussed above for special-status species, the Patterson Pass Project has the potential to affect native wildlife nursery sites (i.e., breeding areas). Because common species may also use these breeding areas, they may also be affected by the project. This would constitute a significant effect. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3a, BIO-4a, BIO-5a, BIO-5c, BIO-7a, BIO-8a, BIO-8b, and BIO-10a would avoid and minimize potential impacts on wildlife nursery areas for special-status and common wildlife species.

As discussed above, the operation of wind turbines after repowering would adversely affect raptors, other birds, and bats migrating through and wintering in the project area because they could be injured or killed if they fly through the rotor plane of operating wind turbines. This would be a significant and unavoidable impact. Implementation of Mitigation Measures BIO-11b, BIO-11c, BIO-11d, BIO-11e, BIO-11i, BIO-12a, BIO-12b, BIO-14a, and BIO-14d would reduce this impact, but not to a less-than-significant level.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle

Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles

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

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

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

Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds

Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts

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

Mitigation Measure BIO-11e: Retrofit existing infrastructure to minimize risk to raptors

Mitigation Measure BIO-11i: Implement an avian adaptive management program

Mitigation Measure BIO-12a: Conduct bat roost surveys

Mitigation Measure BIO-12b: Avoid removing or disturbing bat roosts

Mitigation Measure BIO-14a: Site and select turbines to minimize potential mortality of bats

Mitigation Measure BIO-14d: Develop and implement a bat adaptive management plan

Impact BIO-20a-1: Conflict with local plans or policies—program Alternative 1: 417 MW (less than significant with mitigation)

The ECAP encourages the preservation of areas known to support special-status species, no net loss of riparian and seasonal wetlands, and protection of existing riparian woodland habitat. Additionally, the ECAP has several policies related to windfarms, including establishing a mitigation program to minimize the impacts of wind turbine operations on bird populations. Loss of special-status species and their habitat, loss of alkali meadow, loss of riparian habitat, and loss of existing wetlands as a result of implementing the program would be in conflict with these policies. This impact is significant; however, implementation of Mitigation Measures BIO-1a through BIO-1e, BIO-3a, BIO-4a, BIO-4b, BIO 5a through 5c, BIO-7a, BIO-7b, BIO-8a, BIO-8b, BIO-9, BIO 10a, BIO-10b, and BIO-15, BIO-16, and BIO-18 would reduce this impact to a less-than-significant level because these measures require the project applicant to minimize impacts on habitat for special-status species and compensate for the permanent loss of suitable habitat, as well as to ensure that any impacts on riparian and wetlands are compensated for to ensure no net loss of habitat functions and values. The mitigation measures for the impacts of wind turbine operations on bird populations from the repowering program are consistent with the establishment of a mitigation program recommended by the ECAP.

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

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

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

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

Mitigation Measure BIO-3a: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle

Mitigation Measure BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle

Mitigation Measure BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle

Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians

Mitigation Measure BIO-5b: Compensate for loss of habitat for special-status amphibians

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles

Mitigation Measure BIO-7b: Compensate for loss of habitat for special-status reptiles

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

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

Mitigation Measure BIO-9: Compensate for the permanent loss of foraging habitat for western burrowing owl

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

Mitigation Measure BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger

Mitigation Measure BIO-15: Compensate for the loss of alkali meadow habitat

Mitigation Measure BIO-16: Compensate for the loss of riparian habitat

Mitigation Measure BIO-18: Compensate for the loss of wetlands

Impact BIO-20a-2: Conflict with local plans or policies—program Alternative 2: 450 MW (less than significant with mitigation)

The ECAP encourages the preservation of areas known to support special-status species, no net loss of riparian and seasonal wetlands, and protection of existing riparian woodland habitat. Additionally, the ECAP has several policies related to windfarms, including establishing a mitigation program to minimize the impacts of wind turbine operations on bird populations. Loss of special-status species and their habitat, loss of alkali meadow, loss of riparian habitat, and loss of existing wetlands as a result of implementing the program would be in conflict with these policies. The effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. This impact is significant; however, implementation of Mitigation Measures BIO-1a through BIO-1e, BIO-3a, BIO-4a, BIO-4b, BIO 5a through 5c, BIO-7a, BIO-7b, BIO-8a, BIO-8b, BIO-9, BIO 10a, BIO-10b, and BIO-15, BIO-16, and BIO-18 would reduce this impact to a less-than-significant level because these measures require the project applicant to minimize impacts on habitat for special-status species and compensate for the permanent loss of suitable habitat, as well as to ensure that any impacts on riparian and wetlands are compensated for to ensure no net loss of habitat functions and values. The mitigation measures for the impacts of wind turbine operations on bird populations from the repowering program are consistent with the establishment of a mitigation program recommended by the ECAP.

Impact BIO-20b: Conflict with local plans or policies—Golden Hills Project (less than significant with mitigation)

The ECAP encourages the preservation of areas known to support special-status species, no net loss of riparian and seasonal wetlands, and protection of existing riparian woodland habitat. Additionally, the ECAP has several policies related to windfarms, including establishing a mitigation program to minimize the impacts of wind turbine operations on bird populations. Loss of special-status species and their habitat (Impacts BIO-1b through BIO-10b), loss of alkali meadow (Impact BIO-15b) loss of riparian habitat (Impact BIO-16b), and loss of existing wetlands (Impact BIO-18b) as a result of implementing the Golden Hills Project would be in conflict with these policies. This impact is significant; however, implementation of Mitigation Measures BIO-1a through BIO-1e, BIO-3a, BIO-4a, BIO-4b, BIO 5a through 5c, BIO-7a, BIO-7b, BIO-8a, BIO-8b, BIO-9, BIO 10a, BIO-10b, and BIO-15, BIO-16, and BIO-18 would reduce this impact to a less-than-significant level because these measures require the project applicant to minimize impacts on habitat for special-status species and compensate for the permanent loss of suitable habitat, as well as ensure that any impacts on riparian and wetlands are compensated for to ensure no net loss of habitat functions and values. The mitigation measures for the impacts of wind turbine operations on bird populations from the repowering program are consistent with the establishment of a mitigation program recommended by the ECAP.

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

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

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

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

Mitigation Measure BIO-3a: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle

Mitigation Measure BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle

Mitigation Measure BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle

Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians

Mitigation Measure BIO-5b: Compensate for loss of habitat for special-status amphibians

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles

Mitigation Measure BIO-7b: Compensate for loss of habitat for special-status reptiles

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

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

Mitigation Measure BIO-9: Compensate for the permanent loss of foraging habitat for western burrowing owl

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

Mitigation Measure BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger

Mitigation Measure BIO-15: Compensate for the loss of alkali meadow habitat

Mitigation Measure BIO-16: Compensate for the loss of riparian habitat

Mitigation Measure BIO-18: Compensate for the loss of wetlands

Impact BIO-20c: Conflict with local plans or policies—Patterson Pass Project (less than significant with mitigation)

The ECAP encourages the preservation of areas known to support special-status species, no net loss of riparian and seasonal wetlands, and protection of existing riparian woodland habitat. Loss of special-status species and their habitat (Impacts BIO-1c through BIO-6c), loss of alkali meadow (Impact BIO-15c) loss of riparian habitat (Impact BIO-16c), and loss of existing wetlands (Impact BIO-18c) as a result of implementing the Patterson Pass Project would be in conflict with these policies. This impact is significant; however, implementation of Mitigation Measures BIO-1a through BIO-1e, BIO-3a, BIO-4a, BIO-4b, BIO 5a through 5c, BIO-7a, BIO-7b, BIO-8a, BIO-8b, BIO-9, BIO 10a, BIO-10b, and BIO-15, BIO-16, and BIO-18 would reduce this impact to a less-than-significant level because these measures require the project applicant to minimize impacts on habitat for special-status species and compensate for the permanent loss of suitable habitat, as well as ensure that any impacts on riparian and wetlands are compensated for to ensure no net loss of habitat functions and values.

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

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

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

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

Mitigation Measure BIO-3a: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle

Mitigation Measure BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle

Mitigation Measure BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle

Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians

Mitigation Measure BIO-5b: Compensate for loss of habitat for special-status amphibians

Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles

Mitigation Measure BIO-7b: Compensate for loss of habitat for special-status reptiles

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

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

Mitigation Measure BIO-9: Compensate for the permanent loss of foraging habitat for western burrowing owl

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

Mitigation Measure BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger

Mitigation Measure BIO-16: Compensate for the loss of riparian habitat

Mitigation Measure BIO-18: Compensate for the loss of wetlands

Impact BIO-21a-1: Conflict with provisions of an adopted HCP/NCCP or other approved local, regional, or state habitat conservation plan—program Alternative 1: 417 MW (no impact)

There are no adopted HCP/NCCPs applicable to the program area. The EACCS, while not a formal HCP, provides guidance for the project planning and permitting process to ensure that impacts are offset in a biologically effective manner. As noted above, the mitigation measures set forth in this PEIR are based on measures from the EACCS, with some modifications and additions. Because there are no adopted HCP/NCCPs for the program area and the program would not conflict with the EACCS, there would be no impact.

Impact BIO-21a-2: Conflict with provisions of an adopted HCP/NCCP or other approved local, regional, or state habitat conservation plan—program Alternative 2: 450 MW (no impact)

There are no adopted HCP/NCCPs applicable to the program area. The EACCS, while not a formal HCP, provides guidance for the project planning and permitting process to ensure that impacts are offset in a biologically effective manner. As noted above, the mitigation measures set forth in this

PEIR are based on measures from the EACCS, with some modifications and additions. Because there are no adopted HCP/NCCPs for the program area and the program would not conflict with the EACCS, there would be no impact.

Impact BIO-21b: Conflict with provisions of an adopted HCP/NCCP or other approved local, regional, or state habitat conservation plan—Golden Hills Project (no impact)

There are no adopted HCP/NCCPs applicable to the Golden Hills project area. The EACCS, while not a formal HCP, provides guidance for the project planning and permitting process to ensure that impacts are offset in a biologically effective manner. As noted above, the mitigation measures set forth in this PEIR are based on measures from the EACCS, with some modifications and additions. Because there are no adopted HCP/NCCPs for the project area and the Golden Hills Project would not conflict with the EACCS, there would be no impact.

Impact BIO-21c: Conflict with provisions of an adopted HCP/NCCP or other approved local, regional, or state habitat conservation plan—Patterson Pass Project (no impact)

There are no adopted HCP/NCCPs applicable to the Patterson Pass project area. The EACCS, while not a formal HCP, provides guidance for the project planning and permitting process to ensure that impacts are offset in a biologically effective manner. As noted above, the mitigation measures set forth in this PEIR are based on measures from the EACCS, with some modifications and additions. Because there are no adopted HCP/NCCPs for the project area and the Patterson Pass Project would not conflict with the EACCS, there would be no impact.

3.4.3 References Cited

Printed References

Alameda County. Unpublished data. Avian Use Database. Information gathered as part of the ongoing Avian Fatality Monitoring Program.

———. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

Alameda County SRC. 2010. *Guidelines for Siting Wind Turbines Recommended for Relocation to Minimize Potential Collision-Related Mortality of Four Focal Raptor Species in the Altamont Pass Wind Resource Area*. May 23. Alameda County SRC Document P-70. Available: http://www.altamontsrc.org/alt_doc/p70_src_relocation_guidelines.pdf.

Alarcón, M., C. Aedo, and C. Navarro. 2012. California. Page 818 in B. G. Baldwin, D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken (eds.). *The Jepson Manual: Vascular Plants of California*. Second Edition. Berkeley, CA: University of California Press.

Al-Shehbaz, I. A. 2012. *Caulanthus*. Pages 535–538 in B. G. Baldwin, D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken (eds.). *The Jepson Manual: Vascular Plants of California*. Second Edition. Berkeley, CA: University of California Press.

Alvarez, J. A. 2004. Overwintering California Tiger Salamander (*Ambystoma californiense*) Larvae. *Herpetological Review* 35(4):344.

Anderson, R. L., J. L. Dinsdale, and R. Schlorff. 2007. *California Swainson's Hawk Inventory: 2005–2007.* Final Report. Sacramento, CA: Department of Fish and Game Resource Assessment Program, California Department of Fish and Game.

Anthony, E. L. P., M. H. Stack, and T. H. Kunz. 1981. Night Roosting and the Nocturnal Time Budget of the Little Brown Bat, *Myotis lucifugus*: Effects of Reproductive Status, Prey Density, and Environmental Conditions. *Oecologia* 51(2):151–156.

Arnett, E. B., W. K. Brown, W. P. Erickson, J. K. Fiedler, B. L. Hamilton, T. H. Henry, A. Jain, G. D. Johnson, J. Kerns, R. R. Koford, C. P. Nicholson, T. J. O'Connell, M. D. Piorkowski, and R. D. Tankersley, Jr. 2008. Patterns of Bat Fatalities at Wind Energy Facilities in North America. *Journal of Wildlife Management* 72(1):61–78.

Arnett, E. B., C. D. Hein, M. R. Schirmacher, M. M. P. Huso, and J. M. Szewczak. 2013. Evaluating the Effectiveness of an Ultrasonic Acoustic Deterrent for Reducing Bat Fatalities at Wind Turbines. *PLOS ONE* 8(6):e65794.

Arnett, E. B., M Schirmacher, M. M. P. Huso, and J. P. Hayes. 2009. *Effectiveness of Changing Wind Turbine Cut-in Speed to Reduce Bat Fatalities at Wind Facilities—2008 Annual Report*. April. Annual report submitted to the Bats and Wind Energy Cooperative. Austin, TX: Bat Conservation International.

Audubon Society. 2007. *The 2007 Audubon WatchList.* Available: http://birds.audubon.org/2007-audubon-watchlist. Accessed: May 21, 2014.

Audubon California. 2010. Barn Owl Named Audubon California's 2010 Bird of the Year: Huge Write-in Effort Lands Wins it for Popular Owl Species. *YubaNet.com*. December 14. Available: http://yubanet.com/california/Barn-Owl-named-Audubon-California-s-2010-Bird-of-the-Year.php. Accessed May 21, 2014.

Avian Power Line Interaction Committee. 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*. PIER Final Project Report CEC-500-2006-022. Washington, DC, and Sacramento, CA: Edison Electric Institute, APLIC, and the California Energy Commission.

Baldwin, B. 2012. *Blepharizonia*. P. 262 in B. G. Baldwin, D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken (eds.). *The Jepson Manual: Vascular Plants of California*. Second Edition. Berkeley, CA: University of California Press.

Barclay, R. M. R., E. F. Baerwald, and J. C. Gruver. 2007. Variation in Bat and Bird Fatalities at Wind Energy Facilities: Assessing the Effects of Rotor Size and Tower Height. *Canadian Journal of Zoology* 85:381–387.

Barn Owl Box Company. 2009. *Barn Owls by US States*. Available: http://www.barnowlbox.com/us-barn-owl.html#california_barn_owls. Accessed May 21, 2014.

Barr, C. B. 1991. *The Distribution, Habitat, and Status of the Valley Elderberry Longhorn Beetle:* Desmocerus californicus dimorphus. U.S. Fish and Wildlife Service. Sacramento, CA.

Barry, S. J., and H. B. Shaffer. 1994. The Status of the California Tiger Salamander (*Ambystoma californiense*) at Lagunita: A 50-Year Update. *Journal of Herpetology* 24(2):159–164.

Beedy, E. C., and W. J. Hamilton, III. 1997. *Tricolored Blackbird Status Update and Management Guidelines*. Prepared for U.S. Fish and Wildlife Service, Migratory Birds and Habitat Programs, and California Department of Fish and Game, Bird and Mammal Conservation Program.

———. 1999. Tricolored Blackbird (*Agelaius tricolor*). In A. Poole, (ed.). *The Birds of North America Online.* Ithaca: Cornell Lab of Ornithology. Available: http://bna.birds.cornell.edu/bna/species/423. Accessed: February 12, 2012.

Bloom, P. H. 1980. *The Status of the Swainson's Hawk in California.* Prepared for The Resources Agency: Department of Fish and Game and United States Department of the Interior, Bureau of Land Management.

Brode, J. M., and R. B. Bury. 1984. The Importance of Riparian Systems to Amphibians and Reptiles. Pages 30–36 in R. E. Warner and K. M. Hendrix (eds.). *California Riparian Systems Ecology, Conservation, and Productive Management*. Berkeley, CA: University of California Press.

Brown, P. E., and E. D. Pierson. 1996. *Natural History and Management of Bats in California and Nevada*. Workshop sponsored by the Western Section of The Wildlife Society. November 13–15.

Brown, K., K. S. Smallwood, and B. Karas. 2013*. Vasco Avian and Bat Monitoring Project 2012–2013 Annual Report*. Final. September. Prepared by Ventus Environmental Solutions, Portland, OR. Prepared for NextEra Energy Resources, Livermore, CA.

Buehler, D. A. 2000. Bald Eagle. In A. Poole, (ed.). *The Birds of North America Online.* Ithaca: Cornell Lab of Ornithology. Available: http://bna.birds.cornell.edu/bna/species/506.

Bunn, D. S., A. B. Warburton, and R. D. S. Wilson. 1982. *The Barn Owl*. Vermillion, SD: Buteo Books.

Bunnell, S. T., C. M. White, D. Paul, and S. D. Bunnell. 1997. Stick Nests on a Building and Transmission Towers Used for Nesting by Large Falcons in Utah. *Great Basin Nat.* 57:263–267.

Marti, C. D. 1974. Feeding Ecology of Four Sympatric Owls. *Condor* 76:5–61.California Bat Working Group. 2006. *Guidelines for Assessing and Minimizing Impacts to Bats at Wind Energy Development Sites in California*. September.

California Department of Fish and Game. 1992. *1992 Annual Report on the Status of California State-Listed Threatened and Endangered Animals and Plants*. Sacramento, CA.

———. 1993. Los Vaqueros Project-Fish and Wildlife Impacts. A Status Report.

———. 1994. *Staff Report Regarding Mitigation for Impacts to Swainson's Hawk (*Buteo swainsoni*) in the Central Valley of California*. Sacramento, CA. November 1.

———. 2008. *California Aquatic Invasive Species Management Plan*. January. Sacramento, CA.

———. 2009. *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities*. November 24. Available: http://www.dfg.ca.gov/wildlife/nongame/survey_monitor.html.

———. 2010. *List of Vegetation Alliances and Associations*. September. Vegetation Classification and Mapping Program. Sacramento, CA. Available: http://www.dfg.ca.gov/biogeodata/vegcamp/natural_comm_list.asp. Accessed: December 10, 2013.

———. 2011. *Special Animals List*. Available: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPAnimals.pdf. Accessed: January 2011.

———. 2012. *Staff Report on Burrowing Owl Mitigation*. State of California Natural Resources Agency. March 7.

California Department of Fish and Wildlife. 2013a. *California Natural Diversity Database, RareFind 4*. (May 3, 2013 update). Report for alkali meadow. Sacramento, CA. Accessed: May 2013.

———.2013b. *California Natural Diversity Database, RareFind 4*. (May 3, 2013 update). Sacramento, CA. Search of 7.5-minute Midway, Altamont, Cedar Mountain, Byron Hot Springs, and Clifton Court Forebay quadrangles for special-status plants. Sacramento, CA. Accessed: May 2013.

———.2013c. *California Natural Diversity Database, RareFind 4*. (July 2, 2013 update). Sacramento, CA. Search of 7.5-minute Midway, Altamont, Cedar Mountain, Byron Hot Springs, and Clifton Court Forebay quadrangles for special-status animals. Sacramento, CA. Accessed: July 26, 2013.

California Energy Commission and California Department of Fish and Game. 2007. *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development*. October. Commission Final Report. CEC-700-2007-008-CMF. California Energy Commission, Renewables Committee, and Energy Facilities Siting Division, and California Department of Fish and Game, Resources Management and Policy Division.

California Environmental Services. 2014. *Los Vaqueros Watershed 2013 Annual Golden Eagle Monitoring Report*. January. San Ramon, CA. Prepared for Contra Costa Water District, Concord, CA.

CaliforniaHerps.com. 2013. *A Guide to the Amphibians and Reptiles of California*. Range information for *Phrynosoma blainvillii*, Blainville's Horned Lizard (Coast Horned Lizard). Accessed: April 8, 2013.

California Raptor Center. 2011. *Admissions Statistics.* Available: http://www.vetmed.ucdavis.edu/calraptor/rescue_rehabilitation/admissions_stats.cfm. Accessed: November 9, 2011.

Carlsen, T. M., L. E. Paterson, T. M. Alfaro, and S. D. Gregory. 2012. *Rare Plant Monitoring and Restoration at the Lawrence Livermore National Laboratory Experimental Test Site, Site 300, Project Progress Report 2007 through 2011*. LLNL-TR-585933. Livermore, CA: Lawrence Livermore National Laboratory.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. Office of Biological Services, Fish and Wildlife Service, U.S. Department of the Interior, Washington, D.C.

Cryan, P. M. 2008. Mating Behavior as a Possible Cause of Bat Fatalities at Wind Turbines. April. *Journal of Wildlife Management* 72(3):845–849.

Cryan, P. M., and R. M. R. Barclay. 2009. Causes of Bat Fatalities at Wind Turbines: Hypotheses and Predictions*. Journal of Mammalogy* 90(6):1330–1340.

Curry and Kerlinger, LLC. 2009. *Avian Monitoring Study and Risk Assessment for the Shiloh III Wind Power Project, Solano County, California*. December. McLean, VA. Prepared for enXco, Inc., Tracy, CA.

Dunk, J. R. 1995. White-Tailed Kite (*Elanus leucurus*). In A. Poole, (ed.). *The Birds of North America Online.* Ithaca: Cornell Lab of Ornithology. Available: http://bna.birds.cornell.edu/bna/species/178.

East Bay Regional Parks District. 2000. *Vasco Caves Regional Preserve Resource Management Plan*. Prepared by East Bay Regional Parks District Planning / Stewardship Department in Cooperation with Contra Costa Water District. Oakland, CA.

Eng, L. L, D. Belk, and C. H. Eriksen. 1990. Californian Anostraca: Distribution, Habitat, and Status. *Journal of Crustacean Biology* 10(2):247–277.

Eriksen, C. H., and D. Belk. 1999. *Fairy Shrimps of California's Puddles, Pools, and Playas*. Eureka, CA: Mad River Press.

Essig Museum of Entomology. 2013. *California's Endangered Insects: Curve-Footed Diving Beetle*. Essig Museum of Entomology, University of California, Berkeley. Available: http://essig.berkeley.edu/endins/hygcurve1.htm. Accessed: August 5, 2013.

Estep, J. A. 1989. *Biology, Movements, and Habitat Relationships of the Swainson's Hawk in the Central Valley of California, 1986–1987*. California Department of Fish and Game, Nongame Bird and Mammal Section. Sacramento, CA.

Fellers, G. M., A. Launer, G. Rathbun, S. Bobzien, J. Alvarez, D. Sterner, R. B. Seymour, and M. Westphal. 2001. Overwintering Tadpoles in the California Red-Legged Frog (*Rana aurora draytonii*). *Herpetological Review* 32 (3):156–157.

Gehring, J., P. Kerlinger, and A. M. Manville II. 2009. Communication Towers, Lights, and Birds: Successful Methods of Reducing the Frequency of Avian Collisions. *Ecological Applications* 19:505–514.

Good, R. E., W. Erickson, A. Merrill, S. Simon, K. Murray, K. Bay, and C. Fritchman. 2011. *Bat Monitoring Studies at the Fowler Ridge Wind Energy Facility, Benton County, Indiana*—April 13–October 15, 2010. January 28. Prepared for Fowler Ridge Wind Farm. Cheyenne, WY: Western EcoSystems Technology, Inc.

Good, R. E., A. Merrill, S. Simon, K. Murray, and K. Bay. 2012. *Bat Monitoring Studies at the Fowler Ridge Wind Farm, Benton County, Indiana*—April 1–October 31, 2011. January 31. Prepared for Fowler Ridge Wind Farm. Bloomington, IN: Western EcoSystems Technology, Inc.

Goodrich, L. J., and J. Smith. 2008. Raptor Migration in North America. In K. L. Bildstein, J. Smith, and E. Ruelas (eds.), *The State of North America's Birds of Prey* (. Series in Ornithology Number 3. Orwigsburg, PA: Hawk Mountain Sanctuary,.

Haak, B. A., and S. J. Denton. 1979. Subterranean Nesting by Prairie Falcon. *Raptor Res.* 13:121–122.

Hamilton, W. J., III. 2000. *Tricolored Blackbird 2000 Survey and Population Analysis.* Prepared for U.S. Fish and Wildlife Service, Portland, OR.

Hanes, T. L. 1977. California Chaparral. Pages 41–469 in M. G. Barbour and J. Major (eds.). *Terrestrial Vegetation of California*. NY: John Wiley and Sons.

Hannan, G. L., and C. Clark. 2012. *Eschscholzia*. Pages 982–984 in B. G. Baldwin, D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken (eds.), *The Jepson Manual: Vascular Plants of California*. Second Edition. Berkeley, CA: University of California Press.

Hawk Mountain. 2007. *Conservation Status Reports for the American Kestrel and Red-Tailed Hawk.* Available: http://www.hawkmountain.org/raptorpedia/hawks-at-hawk-mountain/hawk-species-at-hawk-mountain/hawk-species-at-hawk-mountain/page.aspx?id=344. Accessed: May 14, 2014.

Helm, B. 1998. Biogeography of Eight Large Branchiopods Endemic to California. Pages 124–139 in C. W. Witham, E. T. Bauder, D. Belk, W. R. Ferren, Jr., and R. Ornduf (eds.). *Ecology, Conservation, and Management of Vernal Pool Ecosystems—Proceedings from a 1996 Conference*. Sacramento, CA: California Native Plant Society. 285 pages.

Holland, R. F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game, Sacramento, CA.

Howell, J. A. 1997. Avian Mortality at Rotor Swept Area Equivalents, Altamont Pass and Montezuma Hills, California. *Transactions of the Western Section of the Wildlife Society* 33:24–29.

Howell, J. A., and J. E. DiDonato. 1991. *Assessment of Avian Use and Mortality Related to Wind Turbine Operations, Altamont Pass, Alameda and Contra Costa Counties, California, September 1998 through August 1989*. Final. Submitted to U.S. Windpower, Inc. Livermore, CA.

Hull, J. M., R. Anderson, M. Bradbury, J. A. Estep, and H. B. Ernest. 2008. Population Structure and Genetic Diversity in Swainson's Hawks (*Buteo Swainsoni*): Implications for Conservation. *Conservation Genetics* 9(2): 305–316.

Hunt, G. 2002. *The Trend of Golden Eagle Territory Occupancy in the Vicinity of the Altamont Pass Wind Resource Area: 2005 Survey.* Prepared for the California Energy Commission, contract 500-01-032, to the Predatory Bird Research Group, University of California, Santa Cruz.

Hunt, G., and T. Hunt. 2006. *The Trend of Golden Eagle Territory Occupancy in the Vicinity of the Altamont Pass Wind Resource Area: 2005 Survey*. Prepared for the California Energy Commission, contract 500-01-032, to the Predatory Bird Research Group, University of California, Santa Cruz, CA. Report to California Energy Commission, Sacramento, CA.

Hunt, W. G., R. E. Jackman, T. L. Brown, D. E. Driscoll, and L. Culp. 1999. *A Population Study of Golden Eagles in the Altamont Pass Wind Resource Area: Population Trend Analysis 1994–1997*. Prepared for the National Renewable Energy Laboratory, subcontract XAT-6-16459-01 to the Predatory Bird Research Group, University of California, Santa Cruz.

ICF International. 2010. *East Alameda County Conservation Strategy*. Final. October. (ICF 00906.08.) San Jose, CA. Prepared for East Alameda County Conservation Strategy Steering Committee, Livermore, CA.

———. 2012. *Altamont Pass Wind Resource Area Bird Fatality Study, Bird Years 2005–2010*. October. (ICF 00904.08.) Sacramento, CA. Prepared for Alameda County Community Development Agency, Hayward, CA.

———. 2013. *Altamont Pass Wind Resource Area Bird Fatality Study, Bird Years 2005–2011*. November. M87. (ICF 00904.08.) Sacramento, CA. Prepared for Alameda County Community Development Agency, Hayward, CA.

Insignia Environmental. 2012. *Final Report for the Buena Vista Avian and Bat Monitoring Project: February 2008 to January 2011*. September. Palo Alto, CA. Prepared for Contra Costa County, Martinez, CA.

Jennings, M. R., and M. P. Hayes. 1994*. Amphibian and Reptile Species of Special Concern in California*. Rancho Cordova, CA: California Department of Fish and Game.

Jennings, M. R., M. P. Hayes, and D. C. Holland. 1992. *A Petition to the U.S. Fish and Wildlife Service to Place the California Red-Legged Frog (*Rana aurora draytonii*) and the Western Pond Turtle (*Clemmys marmorata*) on the List of Endangered and Threatened Wildlife and Plants*.

Johnsgard, P. A. 1990*. Hawks, Eagles and Falcons of North America: Biology and Natural History*. Washington and London: Smithsonian Institution Press.

Johnson, L. A. 2012. *Navarretia*. Pages 1062–1068 in B. G. Baldwin, D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken (eds.). *The Jepson Manual: Vascular Plants of California*. Second Edition. Berkeley, CA: University of California Press.

Johnston, D. S., J. A. Howell, S. B. Terrill, N. Thorngate, J. Castle, J. P. Smith (H. T. Harvey & Associates); T. J. Mabee, J. H. Plissner, N. A. Schwab, P. M. Sanzenbacher, and C. M. Grinnell (ABR, Inc.). 2013. *Bird and Bat Movement Patterns and Mortality at the Montezuma Hills Wind Resource Area.* June. CEC-500-2013-015. Available: http://www.solanocounty.com/civicax/filebank/blobdload.aspx?blobid=10104. Prepared by H. T. Harvey & Associates. Prepared for the California Energy Commission.

Kelley, R. N., and F. R. Ganders. 2012. *Amsinckia*. Pages 453–454 in B. G. Baldwin, D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken (eds.). *The Jepson Manual: Vascular Plants of California*. Second Edition. Berkeley, CA: University of California Press.

Kochert, M. N., K. Steenhof, C. L. McIntyre, and E. H. Craig. 2002. Golden Eagle (*Aquila chrysaetos*). In A. Poole and F. Gill (eds.). *The Birds of North America*, No. 684. Philadelphia, PA: The Birds of North America, Inc.

Koontz, J. A., and M. J. Warnock. 2012. *Delphinium*. Pages 1136–1142 in B. G. Baldwin, D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken (eds.). *The Jepson Manual: Vascular Plants of California*. Second Edition. Berkeley, CA: University of California Press.

Kunz, T. H., E. B. Arnett, W. P. Erickson, A. R. Hoar, G. D. Johnson, R. P. Larkin, M. D. Strickland, R. W. Thresher, and M. D. Tuttle. 2007. Ecological Impacts of Wind Energy Development on Bats: Questions, Research Needs, and Hypotheses. *Frontiers in Ecology and the Environment* 5(6):315–324.

Kyle, K., and R. Kelsey. 2011. *Results of the 2011 Tricolored Blackbird Statewide Survey.* Audubon California, Sacramento, CA. Available: http://tricolor.ice.ucdavis.edu/downloads.

Loredo, I., D. Van Vuren, and M. L. Morrison. 1996. Habitat Use and Migration Behavior of the California Tiger Salamander. *Journal of Herpetology* 30(2):282–285.

Maclaren, P. A., D. E. Runde, and S. Anderson. 1984. A Record of Tree-Nesting Prairie Falcons in Wyoming. *Condor* 86:487–488.

MacWhirter, R. B., and K. L. Bildstein. 1996. Northern Harrier (*Circus cyaneus*). In A. Poole and F. Gill, (eds.). *The Birds of North America*, No. 210. Philadelphia, PA: The Academy of Natural Sciences and Washington, DC: The American Ornithologists' Union.

Marti, C. D., A. F. Poole, and L. R. Bevier. 2005. Barn Owl (*Tyto alba*). In A. Poole and F. Gill (eds.), *The Birds of North America* Ithaca: Cornell Lab of Ornithology. Retrieved from the Birds of North America Online. Available: http://bna.birds.cornell.edu/bna/species/001. Accessed: May 19, 2014.

Meese, R. J. 2014. *Results of the 2014 Tricolored Blackbird Statewide Survey*. July 31. Davis, CA: University of California, Davis, Department of Environmental Science and Policy.

Mazurek, M. J. 2004. A Maternity Roost of Townsend's Big-Eared Bats (*Corynorhinus townsendii*) in Coast Redwood Basal Hollows in Northwestern California. *Northwestern Naturalist* 85:60–62.

National Audubon Society. 2011. The Christmas Bird Count Historical Results [Online]. Available: http://www.christmasbirdcount.org. Accessed December 12, 2012.

NatureServe. 2012. *NatureServe Explorer: An Online Encyclopedia of Life [web application].* Version 7.1. NatureServe, Arlington, VA. Available: http://www.natureserve.org/explorer. Accessed: May 19, 2014.

Nelson, R. W. 1974. Prairie Falcons: Nesting Attempt on a Building and Effect of Weather on Courtship and Incubation. *Raptor Research Foundation Ethology Information Exchange* 1:10–12.Orloff, S., and A. Flannery. 1992. *Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Area*. Report to California Energy Commission, Sacramento, CA. Santa Cruz, CA: Biosystems Analysis, Inc.

Orloff, S., F. Hall, and L. Spiegel. 1986. Distribution and Habitat Requirements of the San Joaquin Kit Fox in the Northern Extreme of Their Range. *Transactions of the Western Section of the Wildlife Society* 22:60–70.

Pandion Systems, Inc. 2010. Altamont Vasco Repower—Acoustic Bat Monitoring Preliminary Findings. October 8. Appendix C of *Vasco Winds Repowering Project Final Environmental Impact Report*. State Clearinghouse No. 2010032094. April 2011. Martinez, CA: Contra Costa County Department of Conservation and Development.

Phipps, K. B. 1979. *Hunting Methods, Habitat Use and Activity Patterns of Prairie Falcons in the Snake River Birds of Prey Natural Area, Idaho*. Master's Thesis. Western Illinois University, Macomb.

Pierson, E. D., and W. E. Rainey. 1998. *Distribution, Status, and Management of Townsend's Big-Eared Bat (*Corynorhinus townsendii*) in California*. May. BMCP Technical Report Number 96-7. Final Report for Contract No. FG7129. Submitted November 1994 to Wildlife Management Division, Bird and Mammal Conservation Program. Sacramento, CA: California Department of Fish and Game.

Pitcher, E. J. 1977. Nest Site Selection for Prairie Falcons. *Auk* 94:371.

Polite, C. 1990. *California's Wildlife: Barn owl.* California Wildlife Habitat Relationships System, Sacramento, CA: California Interagency Wildlife Task Group, California Department of Fish and Game.

Polite, C., and G. Ahlborn. 1990. *American Kestrel.* Editor: S. Bailey. California Wildlife Habitat Relationships System, California Interagency Wildlife Task Group, California Department of Fish and Game. Available: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx. Accessed: May 19, 2014.

Polite, C., and J. Pratt. 1990. *California's Wildlife: Red-Tailed Hawk*. California Wildlife Habitat Relationships System, Sacramento, CA: California Interagency Wildlife Task Group, California Department of Fish and Game.

Powell, J. A., and C. L. Hogue. 1979. *California Insects*. Berkeley, CA: University of California Press.

Preston, R. E. 2000. Noteworthy Collections: California. *Madroño* 47:138.

Preston, C. R., and R. D. Beane. 1993. Red-Tailed Hawk (*Buteo jamaicensis*). In A. Poole and F. Gill (eds.), *The Birds of North America.* Ithaca: Cornell Lab of Ornithology. Retrieved from the Birds of North America Online. Available: http://bna.birds.cornell.edu/bna/species/052. Accessed: May 2014.

Randall, J. M., and M. C. Hoshovsky. 2000. California's Wildland Invasive Plants. Pages 11–19 in C. C. Bossard, J. M. Randall, and M. C. Hoshovsky (eds.). *Invasive Plants of California's Wildlands*. Berkeley, CA: University of California Press.

Rogers, C. 2001. Revision of the *Nearctic Lepidurus (Notostraca)*. *Journal of Crustacean Biology* 21(4): 991–1006.

Roppe, J. A., S. M. Siegel, and S. E. Wilder. 1989. Prairie Falcon Nesting on Transmission Towers. *Condor* 91:711–712.

Sauer, J. R., J. E. Hines, and J. Fallon. 2008. *The North American Breeding Bird Survey, Results and Analysis 1966–2007.* Version 5.15.2008. Laurel, MD: USGS Patuxent Wildlife Research Center.

Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2011. The North American Breeding Bird Survey, Results and Analysis 1966–2010. Version 12.07.2011. Laurel, MD: USGS Patuxent Wildlife Research Center.

Sawyer, J. O., and T. Keeler-Wolf. 1995. *A Manual of California Vegetation*. Sacramento, CA: California Native Plant Society.

Sherrod, S. K. 1978. Diets of North American Falconi forms. *Journal of Raptor Research* 12:49–121.

Shuford, W. D., and T. Gardali (eds.). 2008. California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. *Studies of Western Birds No. 1*. Western Field Ornithologists, Camarillo, CA, and California Department of Fish and Game, Sacramento, CA.

Smallwood, J. A., and D. M. Bird. 2002. American Kestrel (Falco sparverius). In A. Poole and F. Gill (eds.), *The Birds of North America*. Ithaca: Cornell Lab of Ornithology; retrieved from the Birds of North America Online. Available: http://bna.birds.cornell.edu/bna/species/602. Accessed: May 2014.

Smallwood, K. S., 2010. *Baseline Avian and Bat Fatality Rates at the Tres Vaqueros Wind Project, Contra Costa County, California*. Report to the East Bay Regional Park District., 2010.

Smallwood, K. S., D. A. Bell, S. A. Snyder, J. E. Didonato. 2010. Novel Scavenger Removal Trials Increase Wind Turbine–Caused Avian Fatality Estimates. *Journal of Wildlife Management* 74(5):1089–1097.

Smallwood, K. S., and B. Karas. 2009. Avian and Bat Fatality Rates at Old-Generation and Repowered Wind Turbines in California. *Journal of Wildlife Management* 73(7):1062–1071.

Smallwood, K. S., and L. Neher. 2010. *Siting Repowered Wind Turbines to Minimize Raptor Collisions at the Tres Vaqueros Wind Project, Contra Costa County, California*. April. Draft. Prepared for the East Bay Regional Park District.

Smallwood, K. S., L. Neher, and D. A. Bell. 2009. Map-Based Repowering and Reorganization of a Wind Resource Area to Minimize Burrowing Owl and Other Bird Fatalities. October. *Energies* 2:915–943.

Smallwood, K. S., L. A. Neher, D. A. Bell, J. E. DiDonato, B. R. Karas, S. A. Snyder, and S. R. Lopez. 2008. *Range Management Practices to Reduce Wind Turbine Impacts on Burrowing Owls and Other Raptors in the Altamont Pass Wind Resource Area, California*. California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-080.

Smallwood, K. S., L. Neher, and J. Mount. 2011. *Nesting Burrowing Owl Distribution and Abundance in the Altamont Pass Wind Resource Area, California*. September 16. P228. Prepared for the Altamont Pass Wind Resource Area Scientific Review Committee. Available: http://www.altamontsrc.org/. Accessed: November 26, 2013.

Smallwood, S., and L. Spiegel. 2005a. *Assessment to Support an Adaptive Management Plan for the APWRA*. January 19. CEC-released Technical Report.

———. 2005b. *Partial Re-Assessment of an Adaptive Management Plan for the APWRA: Accounting for Turbine Size*. March 25. CEC-released Technical Report.

———. 2005c. *Combining Biology-Based and Policy-Based Tiers of Priority for Determining Wind Turbine Relocation/Shutdown to Reduce Bird Fatalities*. June 1. CEC-released Technical Report.

Smallwood, K. S., and C. G. Thelander. 2004. *Developing Methods to Reduce Mortality in the Altamont Pass Wind Resource Area*. Final Report by BioResource Consultants to the California Energy Commission, Public Interest Energy Research—Environmental Area 500-01-019.

Stebbins, R. C. 1954. *Amphibians and Reptiles of Western North America.* New York, NY: McGraw-Hill Book Company, Inc.

———. 2003. *Western Reptiles and Amphibians*. Third Edition. New York, NY: Houghton Mifflin Company.

Szewczak, J. M. 2013. Acoustic Bat Survey at Vasco Winds, LLC Wind Area 2012. September. Attachment to *Final 2012–2013 Annual Report, Avian and Bat Monitoring Project, Vasco Winds, LLC*. Prepared for Ventus Environmental Solutions, Portland, OR.

Talley, T. S., D. Wright, M. Holyoak. 2006. *Assistance with the 5-Year Review of the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)*. United States Fish and Wildlife Service. Sacramento, CA.

U.S. Fish and Wildlife Service. 1996. *Programmatic Formal Endangered Species Act Consultation on Issuance of 404 Permits for Projects with Relatively Small Effects on Listed Vernal Pool Crustaceans within the Jurisdiction of the Sacramento Field Office, California*. February 28. 1-1-96-F-1. Issued by Ecological Services, Sacramento Field Office, Sacramento, CA.

———. 1998. *Recovery Plan for Upland Species of the San Joaquin Valley, California*. Region 1, Portland, OR.

———. 1999. *Conservation Guidelines for the Valley Elderberry Longhorn Beetle*. Sacramento Fish and Wildlife Office, Sacramento, CA. Revised July 9.

———. 2002a. *Recovery Plan for the California Red-Legged Frog (*Rana aurora draytonii*)*. Portland, OR.

———. 2002b. *Draft Recovery Plan for Chaparral and Scrub Community Species of San Francisco Bay, California*. November. Portland, OR.

———. 2007. *Longhorn Fairy Shrimp (*Branchinecta longiantenna*) 5-Year Review: Summary and Evaluation*. Prepared by the Sacramento Fish and Wildlife Office. Sacramento, CA.

———. 2010. *San Joaquin Kit Fox (*Vulpes macrotis mutica*) 5-Year Review: Summary and Evaluation*. Prepared by the Sacramento Fish and Wildlife Office. Sacramento, CA.

———. 2011. *U.S. Fish and Wildlife Service Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox prior to or during Ground Disturbance*. January. Sacramento, CA: Sacramento Fish and Wildlife Office. Available: http://www.fws.gov/sacramento/es/survey-protocols-guidelines/Documents/kitfox_standard_rec_2011.pdf. Accessed: December 12, 2013.

———. 2012. *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines*. March 23. OMB Control No 1018-0148.

———. 2013a. *Eagle Conservation Plan Guidance: Module 1—Land-Based Wind Energy*. Version 2. April. Division of Migratory Bird Management. Available: http://www.fws.gov/windenergy/eagle_guidance.html. Last updated: June 27, 2014.

———. 2013b*. List of Federal, Endangered and Threatened Species that Occur in or may be Affected by Projects in the U.S. Geological Survey 7.5-Minute Midway, Altamont, Cedar Mountain, Byron Hot Springs, Clifton Court Forebay Quadrangles*. Last Revised: September 18, 2011. Available: www.fws.gov/sacramento/es/spp_lists/auto_list.cfm. Accessed: July 1, 2013.

U.S. Geological Survey. 2013. *Estimation of Site Occupancy and Nesting Success of Golden Eagles in the Diablo Mountains of Central California*. August. Information Brief. Forest and Rangeland Ecosystem Science Center.

Western Bat Working Group. 2005. *Townsend's Big-Eared Bat*. Species account developed for the 1998 Reno Biennial Meeting; updated at the 2005 Portland Biennial Meeting. Original account by Rick Sherwin; 2005 update by Antoinette Piaggio. Available: http://www.wbwg.org. Accessed: December 20, 2013.

———. 2007. *Regional Bat Species Priority Matrix*. Available: http://www.wbwg.org/spp_matrix.html.

Weller, T. J., and J. A. Baldwin, 2011. Using Echolocation Monitoring to Model Bat Occupancy and Inform Mitigations at Wind Energy Facilities. *The Journal of Wildlife Management* 9999:1–13; 2011; DOI: 10.1002/jwmg.260.

Western EcoSystems Technology, Inc. 2008. *Diablo Winds Wildlife Monitoring Progress Report, March 2005–February 2007*. August. Cheyenne, WY.

Williams, D. F. 1986. *Mammalian Species of Concern in California*. California Department of Fish and Game Report 86-1. California Department of Fish and Game, Sacramento, CA. 112 pages.

Yosef, R. 1996. Loggerhead Shrike (*Lanius ludovicianus*). In A. Poole and F. Gill (eds.), *The Birds of North America*. Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online. Available: http://bna.birds.cornell.edu/bna/species/231. Accessed: May 2014.

Zacharias, E. H. 2012. *Atriplex*. Pages 630–638 in B. G. Baldwin, D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken (eds.). *The Jepson Manual: Vascular Plants of California*. Second Edition. Berkeley, CA: University of California Press.

Zeiner, D. C., W. F. Laudenslayer, Jr., and K. E. Mayer (eds.). 1988. *California's Wildlife*. *Volume I: Amphibians and Reptiles*. California Statewide Wildlife Habitat Relationships System. Sacramento, CA: California Department of Fish and Game.

———. 1990a. *California's Wildlife. Volume II: Birds*. California Statewide Wildlife Habitat Relationships System. Sacramento, CA: California Department of Fish and Game.

———. 1990b. *California's Wildlife. Volume III: Mammals*. California Statewide Wildlife Habitat Relationships System. Sacramento, CA: California Department of Fish and Game.

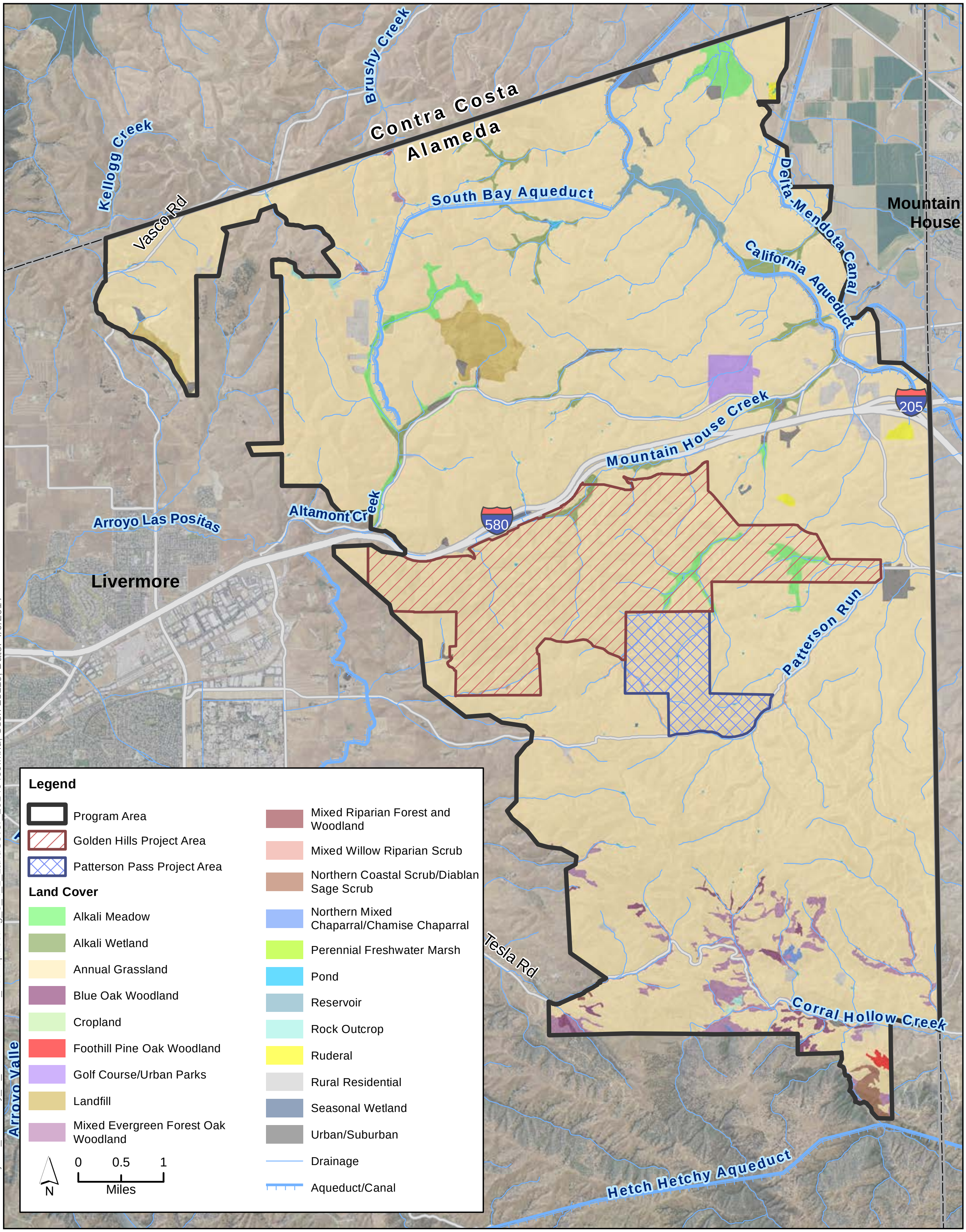
Zweifel, R. G. 1955. Ecology, Distribution, and Systematics of Frogs of the *Rana boylei* Group. *University of California Publications in Zoology* 54 (4):207–292.

Personal Communications

Arnold, Richard A., PhD. 2011. Entomologist, Entomological Consulting Services Ltd., Pleasant Hill, CA. August 22 and 23, 2011—Written comments on the Draft Supplemental Biological Assessment for PG&E's Valley Elderberry Longhorn Beetle Conservation Program.

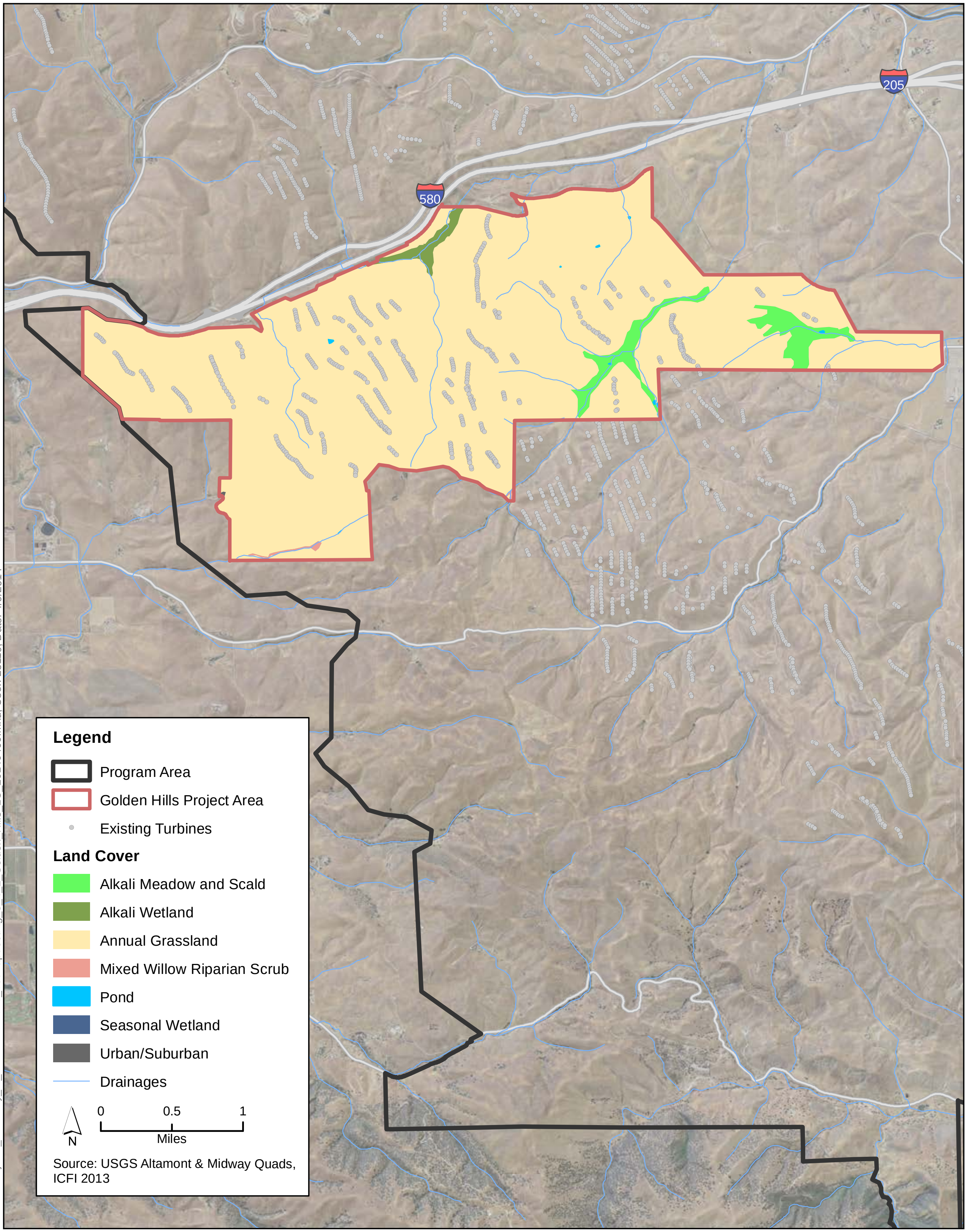
Barton, Chris. 2014. Acting Environmental Programs Manager. July 21, 2014—Letter to Sandra Rivera, Assistant Planning Director, Alameda County with comments on the APWRA Repowering Draft EIR.

Stedman, Bret. Manager, California Raptor Center, UC Davis. December 13, 2012—Email correspondence with Lucas Bare, ICF International, Englewood, CO.



Altamont Pass Wind Resource Area
Repowering Program

Figure 3.4-1
Land Cover Types in the Program Area

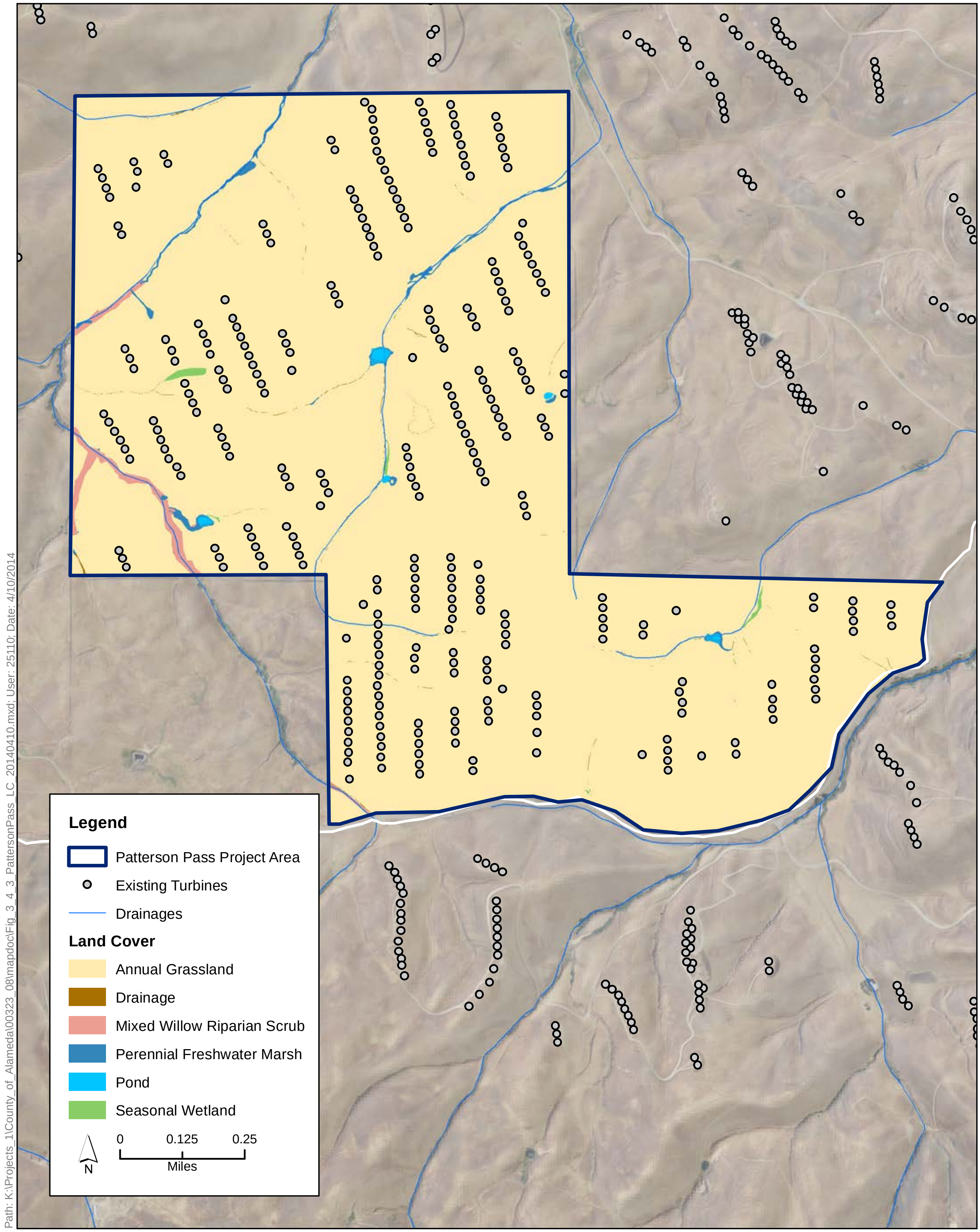


Path: K:\Projects_1\County_of_Alameda\00323_08\mapdoc\Fig_3_4_2_Golden_Hills_LC_20140409.mxd; User: 25110; Date: 4/9/2014

ICF INTERNATIONAL

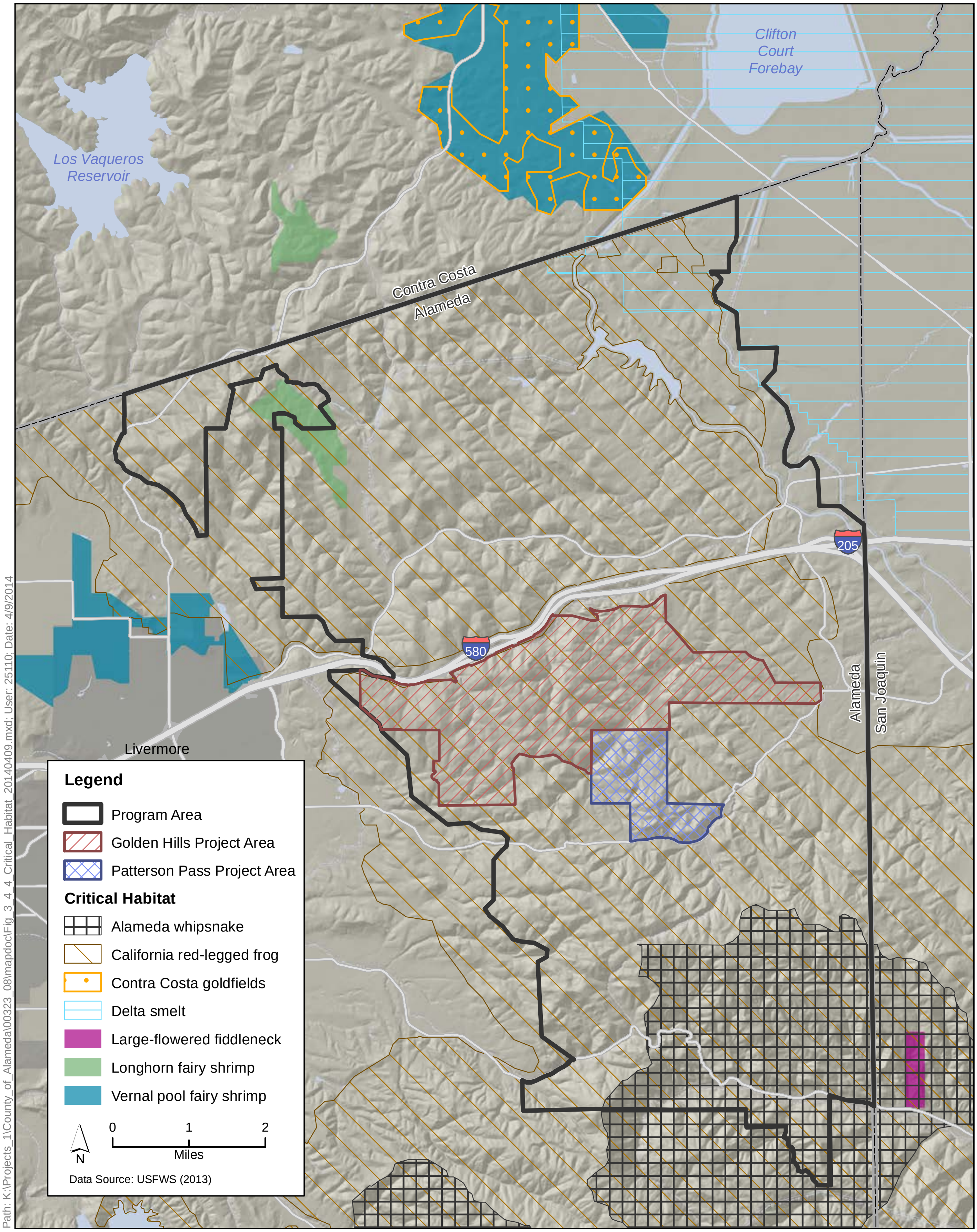
Altamont Pass Wind Resource Area
Repowering Program

Figure 3.4-2
Land Cover in the Golden Hills Project Area



Altamont Pass Wind Resource Area
Repowering Program

Figure 3.4-3
Land Cover in the Patterson Pass Project Area



Altamont Pass Wind Resource Area
Repowering Program

Figure 3.4-4
Critical Habitat in and near the Program Area

3.5 Cultural Resources

This section describes the regulatory and environmental setting for cultural resources in the program and project areas: archaeological materials, human remains, and historic architecture, places, and artifacts. It also describes impacts on cultural resources that would result from implementation of the program and the two individual projects. Mitigation measures are prescribed where feasible and appropriate.

3.5.1 Existing Conditions

Regulatory Setting

Federal

Archaeological and architectural resources (buildings and structures) are protected through the National Historic Preservation Act (NHPA) of 1966, as amended (16 USC 470f), and its implementing regulations: Protection of Historic Properties (36 CFR Part 800), the Archaeological and Historic Preservation Act of 1974, and the Archaeological Resources Protection Act of 1979.

Prior to implementing an "undertaking" (e.g., issuing a federal permit), Section 106 of the NHPA requires federal agencies (e.g., U.S. Army Corps of Engineers, National Park Service) to consider the effects of the undertaking on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) and the State Historic Preservation Officer (SHPO) a reasonable opportunity to comment on any undertaking that would adversely affect properties eligible for listing on the National Register of Historic Places NRHP). NHPA Section 101(d)(6)(A) allows properties of traditional religious and cultural importance to a tribe to be determined eligible for inclusion in the National Register. Under the NHPA, a find is significant if it meets the National Register listing criteria under 36 CFR 60.4, as stated below.

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:
>
> a) That are associated with events that have made a significant contribution to the broad patterns of our history, or
>
> b) That are associated with the lives of persons significant in our past, or
>
> c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or
>
> d) That have yielded, or may be likely to yield, information important in prehistory or history.

Federal review of projects is normally referred to as the Section 106 process. The Section 106 process normally involves step-by-step procedures that are described in detail in the implementing regulations (36 CFR Part 800) and summarized here.

- Establish a federal undertaking.
- Delineate the Area of Potential Effects.

- Identify and evaluate historic properties in consultation with the SHPO and interested parties.
- Assess the effects of the undertaking on properties that are eligible for inclusion in the National Register.
- Consult with the SHPO, other agencies, and interested parties to develop an agreement that addresses the treatment of historic properties and notify the Advisory Council on Historic Preservation.
- Proceed with the project according to the conditions of the agreement.

State

The State of California implements the NHPA through its statewide comprehensive cultural resource preservation programs. The California Office of Historic Preservation (OHP), an office of the California Department of Parks and Recreation, implements the policies of the NHPA on a statewide level. The OHP also maintains the California Historical Resources Inventory. The SHPO is an appointed official who implements historic preservation programs within the State's jurisdiction.

California Environmental Quality Act (CEQA)

CEQA, as codified in PRC Sections 21000 et seq. and implemented via the CEQA Guidelines (14 CCR Section 15000 et seq.), is the principal statute governing the environmental review of projects in the state. The CEQA Guidelines define a historical resource as: (1) a resource in the California Register of Historic Resources (CHRH); (2) a resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); or (3) any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

The CRHR is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change (PRC Section 5024.1[b]). The CRHR criteria are based on NRHP criteria. Certain resources are determined by CEQA to be automatically included in the California Register, including California properties formally eligible for or listed in the National Register. To be eligible for the California Register as a historical resource, a prehistoric or historic-period resource must be significant at the local, state, and/or federal level under one or more of the following criteria [14 CCR Section 4852(b)].

(A) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

(B) Is associated with the lives of persons important in our past;

(C) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or,

(D) Has yielded, or may be likely to yield, information important in prehistory or history.

For a resource to be eligible for the CRHR, it must also retain enough integrity to be recognizable as a historical resource and to convey its significance. A resource that does not retain sufficient integrity to meet the NRHP criteria may still be eligible for listing in the California Register.

CEQA requires lead agencies to determine if a proposed project would have a significant effect on important historical resources or unique archaeological resources. If a lead agency determines that an archaeological site is a historical resource, the provisions of PRC Section 21084.1 and State CEQA Guidelines Section 15064.5 would apply. If an archaeological site does not meet the State CEQA Guidelines criteria for a historical resource, then the site may meet the threshold of PRC Section 21083.2 regarding unique archaeological resources. A unique archaeological resource is an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria [PRC Section 21083.2 (g)].

(1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.

(2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.

(3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

The State CEQA Guidelines note that if a resource is neither a unique archaeological resource nor a historical resource, the effects of the project on that resource shall not be considered a significant effect on the environment (State CEQA Guidelines Section 15064[c][4]).

Local

The Alameda County General Plan consists of several documents that discuss specific geographic areas in detail in the western part of the county, as well as general goals, policies, and actions for house, safety, conservation, open space, noise, and recreation. In 2012, the Alameda County Board of Supervisors adopted a historic preservation ordinance that codified the definition and maintenance of the Alameda County Register of Historic Resources, how properties can be added or removed from the county register, and what activities may be subject to review. The ordinance also provided incentives for the preservation of historic resources.

Environmental Setting

Prehistoric Context

The Bay Area was a region of intense human occupation long before the European explorers settled in the region in the eighteenth century. In the early twentieth century, the prehistory of the region was virtually unknown, aside from a small amount of ethnographic information (Kroeber 1925) and the discovery of a few prehistoric sites at the southern end of the San Francisco Bay (Nelson 1909).

Milliken et al. (2007) present the idea that a series of culture changes in the San Francisco Bay Area took place during the 11500–8000 cal B.C. time frame, suggesting that Clovis big-game hunters, then initial Holocene gatherers, lived in the area. Presumably, however, evidence to support this has been washed away by stream action, buried under more recent alluvium, or submerged on the continental shelf (Rosenthal and Meyer 2004:1). There is evidence, however, for an in-place forager economic pattern, beginning around 8000 cal B.C., followed by a series of five cycles of change that began at approximately 3500 cal B.C., as described below.

The Early Holocene (Lower Archaic), cal 8000 to 3500 B.C.

Between cal 8000 and 3500 B.C., the Bay Area appears to have been occupied by a widespread but sparse population of hunter-gatherers. The millingslab and handstone, as well as a variety of large, wide-stemmed and leaf-shaped projectile points, all emerged during this period (Milliken et al. 2007:114).

The Early Period (Middle Archaic), cal 3500 to 500 B.C.

Several technological and social developments characterize this period in the Bay Area. Rectangular *Haliotis* and *Olivella* shell beads, the markers of the Early Period bead horizon, continued in use until at least 2,800 years ago (Ingram 1998; Wallace and Lathrop 1975:19). The mortar and pestle were first documented in the Bay Area shortly after 4000 B.C., and by 1500 cal B.C., cobble mortars and pestles, and not millingslabs and handstones, were used at sites throughout the Bay Area, including ALA-307 (West Berkeley) and ALA-483 (Livermore Valley) (Wiberg 1996:373).

Lower Middle Period (Initial Upper Archaic), 500 cal B.C.to cal A.D. 430)

Although it is unclear when the “major disruption in symbolic integration systems” originated, it is clear in the record around 500 B.C. and may have begun several hundred years earlier (Milliken et al. 2007:115). A new suite of decorative and presumed religious objects appeared during the Early Period–Middle Period Transition (EMT) (Elsasser 1978), which corresponds to the beginning of this period. Bead Horizon M1 of the Middle Period (Upper Archaic, 200 cal B.C. to cal A.D. 430), which developed out of the EMT, marked the first of a series of bead horizons of central California bead trade until cal A.D. 1000 (Groza 2002).

Upper Middle Period (Late Upper Archaic), cal A.D. 430 to 1050)

During the Upper Middle Period (Late Upper Archaic) (cal AD 430 to 1050), the *Olivella* saucer bead trade network of the Lower Middle Period collapsed. More than half of the known M1 sites were abandoned. In the remaining sites, the number of sea otter bones greatly increased (Bennyhoff 1994a, 1994b).

Initial Late Period (Lower Emergent), cal A.D. 1050 to 1550

During this period, burial objects became much more elaborate, and initial markers of the Augustine Pattern appeared in the form of multi-perforated and bar-scored *Haliotis* ornaments and new *Olivella* bead types in sites such as SCL-690 (Hylkema 2007). Classic Augustine Pattern markers, which appeared in bead horizon L1 (after cal AD 1250), include the arrow, flanged pipe, *Olivella* callus cup bead, and the banjo effigy ornament (Bennyhoff 1994c).

Evidence for increased social stratification throughout the Bay Area after AD 1250 can be found in mortuary evidence, such as higher-quality burial items in high-status burials and cremations (Fredrickson 1994:62). This may have reflected a new regional ceremonial system that was the precursor of the ethnographic Kuksu cult, a ceremonial system that unified the many language groups around the Bay Area during bead horizon L1 (Milliken et al. 2007:117).

Terminal Late Period: Protohistoric Ambiguities

An upward cycle of regional integration was likely commencing around the time of Spanish settlement in the Bay Area. Such regional integration was a continuing characteristic of the Augustine Pattern, most likely brought to the Bay Area by Patwin speakers from Oregon, who introduced new tools (such as the bow) and traits (such as pre-interment grave-pit burning) into central California. Perhaps the Augustine Pattern, with its inferred shared regional religious and ceremonial organization, was developed as a means of overcoming insularity, not in the core area of one language group, but in an area where many neighboring language groups were in contact (Milliken et al. 2007:118).

Ethnography

The program area is located within the ancestral territory of the Ohlone. Historically, the Ohlone were called the Costanoan Indians. *Costanoan* is derived from the Spanish word *costaños*, meaning "people of the coast" (Levy 1978:494). The term Ohlone or Costanoan denotes a larger group with many other tribelets throughout the Bay Area (Levy 1978:485). The term *Ohlone* is preferred by the present-day members of the group.

The Ohlone are believed to have inhabited the area since AD 500 or earlier. Their territory extended along the coast from San Francisco Bay in the north to just beyond Carmel in the south, and as much as 60 miles inland.

The Ohlone are a linguistically defined group. Eight different but related languages were spoken by the Ohlone. The Ohlone languages, together with Miwok, comprise the Utian language family of the Penutian stock (Levy 1978:485-486).

The program area is within the territories of the *Luecha* and *Ssaoam* tribelets of Ohlone. Milliken placed the Luechas on Corral Hollow and Arroyo Mocho in the "rough lands southeast of the Livermore Valley" (Milliken 1995:247). However, they may have primarily dwelled farther east, along the San Joaquin River (Schenck 1926:133). The Ssaoam tribe lived in the dry hills and tiny valleys around Bushy Peak and Altamont Pass, hill lands which separated the Livermore Valley from the San Joaquin Valley (Milliken 1995:255).

The Ohlone were hunter-gatherers and relied on acorns and seafood; however, they also exploited many other foods, including various seeds (growth was promoted by controlled burning), berries, roots, land and sea mammals, reptiles, and insects (Levy 1978:491-493).

Aboriginally, the Ohlone were politically organized by tribelet, each having a designated territory. A tribelet comprised one or more villages and camps within a territory often designated by geographic features. Tribelets generally had 100 to 250 members (Kroeber 1925). The office of tribelet chief was inherited patrilineally and could be occupied by a man or woman. Duties of the chief included directing ceremonial activities and serving the leader of a council of elders, which functioned primarily in an advisory capacity to the community (Levy 1978:487).

Seven Spanish missions were founded in Ohlone territory between 1777 and 1797. Mission life, for the most part, was devastating to the Ohlone population. As a result of introduced diseases and a declining birth rate, the Ohlone population fell from 10,000 or more in 1770 to less than 2,000 in 1832 (Cook 1943a, 1943b; Levy 1978:486). After the missions were secularized by the Mexican government (around 1830), many Native Americans, including Ohlones, left the missions in an attempt to reestablish their previous lives. Many Ohlone found work as wage laborers on the ranchos and mines or in domestic positions. There was a partial return to aboriginal religious practices and subsistence strategies, but for the most part, the Ohlone culture was greatly diminished (Levy 1978:486-487). Today, descendants of the Ohlone still live in the area, and many are active in maintaining their traditions and advocating Native American issues.

3.5.2 Environmental Impacts

Methods for Analysis

Records Search

A cultural resources records search was conducted at the California Historical Resources Information System (CHRIS) Northwest Information Center (NWIC), Sonoma State University, Rohnert Park, in June 2013. The records search encompassed the program area (in which the Golden Hills and Patterson Pass project areas are contained) and a 1/8-mile search radius around the program area.

The records search included reviews of the NWIC databases of archaeological sites and reports; the National Register and the Directory of Archaeological Determinations of Eligibility for California through June 2013; the California Register, California Historical Landmarks, and Points of Historical Interest; the California Inventory of Historic Resources; and the Historic Property Date Files for Alameda County through 2013. The NWIC records search also included review of the General Land Office (GLO) 1862 Canada de Los Vaqueros plat map; and the 1862 and 1867 plats of Township 2 South, Range 3 East. None of the GLO plats contained any cultural information within the program area.

Records search results for the program area and the individual project areas—Patterson Pass and Golden Hills—are discussed below. The project areas are much smaller than the program area and contain fewer resources and have had fewer studies than the program area.

Program Area

The NWIC records search identified 90 cultural resources within the program area. Of those 90 resources, 9 are prehistoric, 1 is multi-component (a site with both historic archaeological and prehistoric components), and the remaining sites are historic-period sites: 55 historic archaeological (including 4 isolates), 19 historic architectural, and 6 sites with both historic archaeological and architectural components.

Because of the large amount of resources identified within the program area, all of these resources will not be presented here. However, the different types of resources will be briefly discussed.

The prehistoric resources within the program area include two rockshelters, three bedrock mortar sites, a seasonal occupation site, and a scatter of milling slab fragments and a bowl mortar. The multi-component site is P-01-011054, the Tesla Complex. This complex consists of two prehistoric features and seven loci of historic-period mining and residential features (Newland and Erickson 2010). None of these resources have been evaluated for NRHP or CRHR eligibility.

The Brushy Peak Archaeological District (P-01-011111) is adjacent to the program area. This district is located at the Brushy Peak Regional Preserve in the East Bay Regional Park District (EBRPD), and its boundaries correspond to those of the property line of EBRPD (Fentress and Guerrero 2010), which is surrounded on three sides by the program area. It consists of a Native American village and bedrock mortar complexes. The district also includes four distinct loci containing various bedrock mortars and/or lithic scatters. One of these loci, Locus 1, is a previously recorded site, CA-ALA-622. CA-ALA-622 consists of a variety of bedrock mortars and lithic scatters in four distinct areas. In the district form, P-01-011111 has a NRHP status of 3S. However, the district is not yet listed in the NRHP.

Historic resources within the program area include a variety of historic-era archaeological sites and isolates, structures and objects, and sites comprised of both archaeological and architectural components.

The historic-era archaeological resources include resources associating with mining (mine adits, shafts, portals, waste rock piles, depressions, and prospecting scrapes); house sites (including foundations); artifact scatters (consisting of glass and ceramic fragments; construction and building debris; part of farm machinery/equipment, and cans and other metal items); isolated glass and fence post fragments; former reservoir or pond sites; remnants of corrals and windmills; pipe frames; former mining town sites (Harrietville, Harrisville); drainages and overflow channels; historic roads (the Tesla-Livermore Road, the West Mitchell Ravine Road, and the Mitchell Ravine Road); a historic-era private family cemetery (with gravel and telephone poles placed horizontally around the perimeter to protect the area); and the leveled field from the Old Tesla baseball field.

The historic architectural resources include transmission lines, canals, extant residential structures and ranching complexes, the Southern (Union) Pacific Railroad, bridges, corrals/troughs, and a culvert. Those resources that contain both historic-era archaeological and architectural components are comprised of former ranch complexes and homestead sites with extant buildings and structures, collapsed structures, foundations, and artifact scatters.

Table 3.5-1 presents the resources within the program area that have been considered for NRHP or CRHR eligibility and their status, if applicable.

The NWIC records indicated that about 130 studies have been conducted within or adjacent to the program area and that approximately 75% of the program area has been studied. Because of the extensive number of studies that have been conducted within the program area, they will not be discussed in detail in this document. However, it will be noted that portions of the program area have been extensively studied, through a variety of survey reports. Many of the studies conducted in the 1980s were for various phases and locations of the current windfarms within the program area. Additional studies within the program area include studies for landfill sites and associated facilities, pipelines and transmission lines, property evaluations, bridge assessments, cellular tower studies, water conveyance development and improvement, road improvements, studies for the Brushy Peak Regional Preserve, and a variety of overview studies covering historic, ethnographic, and geoarchaeological topics in Alameda County and beyond.

Table 3.5-1. Resources within the Program Area Considered for NRHP/CRHR Eligibility

Resource Number	Site Period	Site Type	Description	Location	NRHP/CRHR Eligibility
P-01-010447/ CA-ALA-596	Historic Architectural	Historic–Transmission line	Segment of the Tracy-Contra Costa-Ygnacio Transmission line; constructed in 1951	Within program area	NRHP status code 6Z
P-01-010448/ CA-ALA-587	Historic Architectural	Historic–Transmission line	Segment of the Tracy-Los Vaqueros Transmission Line; constructed in 1951	Within program area	NRHP status code 6Z
P-01-010501	Historic Architectural	Historic–Rail line segment	Segment of the Southern (Central) Pacific Railroad Grade where it crosses Midway Road; 100 feet long; centered on Midway Road; tracks and ties have been removed; however, the grade is in excellent condition and retains its ballast rock	Within program area	The CPRR may meet CRHR Criteria 1 and 3, but it has not been formally evaluated
P-01-010504	Historic Archaeological and Architectural	Historic–Windmill and farm features	Water pumping windmill, with an associated abandoned truck, collapsed water tank, concrete trough, and a cattle corral	Within program area	Recommended not eligible for NRHP or CRHR
P-01-010613	Historic Archaeological and Architectural	Historic–Road	Segment of Grant Line Road - paved, 2 lanes, approximately 30 feet wide; route was placed as early as 1874; the Road runs along the route of the original Lincoln Highway (the first paved transcontinental road)	Within program area	Appears to meet CRHR Criterion 1 but has not been formally evaluated
P-01-010947	Historic Architectural	Historic–Transmission line	Pittsburg-Tesla 230kV transmission line, approximately 31 miles long and oriented northwest to southeast; constructed by PG&E in 1959–1960	Within program area	Recommended not eligible for NRHP or CRHR
P-01-011111	Prehistoric and Historic	Prehistoric–Archaeological District	Brushy Peak Archaeological District: a prehistoric habitation site with bedrock mortar complexes; four human burials were exposed during wetlands pond construction in 2006; obsidian projectile point, chert flake stone tools and debitage, ground stone tools, and fire-affected rock were observed	Adjacent to program area	NRHP status code 3S
P-01-011114	Prehistoric	Prehistoric–Outcrop	24+ bedrock mortars and a cupule are located on sandstone outcrops and boulders; sandstone formations are located in open grassland	Within P-01-11111, which is adjacent to the program area	Within the Brushy Peak Archaeological District (NRHP status code 3S)

Golden Hills Project Area

Three resources were identified by the NWIC as being in the Golden Hills project area. All three are historic-era resources.

- P-01-000163/CA-ALA-441H: a historic-era ranch complex consisting of 5 separate features (2 stream ripraps, one stream riprap/possible check dam, one possible check dam, and footings for two structures with possible drainage ditches and a sparse scatter of ceramic and glass fragments and metal/construction debris.
- P-01-000177/CA-ALA-455H: the Santucci Property Homestead, a historic-era ranch complex with standing buildings (barns, shed, root cellar, cattle feeding areas); corrals, fences, foundations, collapsed structure; various construction and domestic debris.
- P-01-010957: the remnants of an abandoned corral.

None of these resources has been evaluated for NRHP/CRHR eligibility.

Twenty-three studies have been conducted within or adjacent to portions of the Golden Hills project area. About 75% of this project area has been studied.

- S-121, Fredrickson, D. and P. Banks. 1975. *An Archaeological Reconnaissance of the Proposed Altamont Landfill Site*. No resources in the Golden Hills project area were identified during this study.
- S-2623, Holman, M. 1981. *Archaeological Reconnaissance of the Windpower Generator Farm to be Located on the Jess Ranch East of Livermore, Alameda County* (letter report). No resources in the Golden Hills project area were identified during this study.
- S-2865, Holman, M. 1982. *Archaeological Field Reconnaissance of the Wind Farm Planned for the Lands of Mulqueeney and Hera in Alameda County* (letter report). No resources in the Golden Hills project area were identified during this study.
- S-5657, Slater, S. and M. Holman. 1982. *An Archaeological Reconnaissance of Six Windfarm Parcels near Altamont Pass, Alameda County*. No resources in the Golden Hills project area were identified during this study.
- S-5659, Holman, M. 1982. *An Archaeological Field Reconnaissance of Properties Being Considered for Windfarm Development* (letter report). No resources in the Golden Hills project area were identified during this study.
- S-5862, Holman, M. 1982. *An Archaeological Reconnaissance of the Proposed Fayette Manufacturing Company Wind Farm on the Morgan, Shuff, Haera, and Costello Properties, Altamont Pass, Alameda County, California*. No resources in the Golden Hills project area were identified during this study.
- S-5868, Holman, P. 1983. *A Field Archaeological Reconnaissance of a Proposed Wind Farm for the Fields Ranch, Altamont Pass, Alameda County* (letter report). No resources in the Golden Hills project area were identified during this study.
- S-6007, Fredrickson, D. 1983. *Archaeological Survey of the Wind Energy Company Project Area near Altamont Pass, Alameda County, California*. No resources in the Golden Hills project area were identified during this study.

- S-6125, Holman, M. 1983. *An Archaeological Reconnaissance of the Ralph Properties Windfarm Project Area, Altamont Pass, Alameda County, CA*. No resources in the Golden Hills project area were identified during this study.
- S-6489, Clark, M. 1984. *Archaeological Reconnaissance of the Gomes North Parcel, Alameda County, CA*. No resources in the Golden Hills project area were identified during this study.
- S-7075, Holman, M. 1984. *Santucci Property Archaeological Reconnaissance* (letter report). P-01-000177/CA-ALA-455H was identified during this study.
- S-8942, Ruckle, J. 1974. *Archaeology of the California State Water Project*. No resources in the Golden Hills project area were identified during this study.
- S-9119, Killam, W. 1987. *Cultural Resources Investigations and Intensive Survey for the Lawrence Livermore Direct Service 230-kV Transmission Line*. P-01-000163/CA-ALA-441H was identified during this study.
- S-9995, Killam, W. 1988. *Cultural Resources Investigations for the Tracy-Banks Transmission Line, Alameda County, CA*. No resources in the Golden Hills project area were identified during this study.
- S-11396, BioSystems Analysis, Inc. 1989. *Technical Report of Cultural Resources Studies for the Proposed WTG-WEST, Inc., Los Angeles to San Francisco and Sacramento, CA: Fiber Optics Project*. No resources in the Golden Hills project area were identified during this study.
- S-17993, Hatoff, B. B. Voss, S. Waechter, S. Wee, and V. Bente. 1995. *Cultural Resources Inventory Report for the Proposed Mojave Northward Expansion Project*. No resources in the Golden Hills project area were identified during this study.
- S-18762, Archeo-Tec. 1989. *Cultural Resources Evaluation of the Proposed Mountain House Planned Community, Alameda and San Joaquin Counties, CA*. No resources in the Golden Hills project area were identified during this study.
- S-27973, Dice, M. 2003. *Records Search and Site Visit for Sprint Telecommunications Facility Candidate SF58XC002A (Altamont Pass), 11830 South Highway 580 East, Livermore, Alameda County* (letter report). No resources in the Golden Hills project area were identified during this study.
- S-29359, Pastron, A. and R. Brown. 1998. *Historical Cultural Resource Assessment, Existing Telecommunications Facility, I-580-C, Site No. PL-110-03, 11701 N. Flynn Road, Livermore* (letter report). No resources in the Golden Hills project area were identified during this study.
- S-32791, Psota, S., M. Newland, and A. Praetzellis. 2000. *Attachment A, Site Description and Photographs, PL-113-02 Monopole, 11700 N. Flynn Road, Livermore, CA*. No resources in the Golden Hills project area were identified during this study.
- S-35187, Schmid, T. 2008. *Archaeological Survey Report, Clifton Court Forebay Delta Maintenance Project*. No resources in the Golden Hills project area were identified during this study.
- S-35796, Siskin, B., C. DeBaker, and J. Lang. 2009. *Cultural Resources Investigations and Architecture of the Pittsburg-Tesla Transmission Line, Contra Costa and Alameda Counties, CA*. P-01-000957 was recorded during this study.

Patterson Pass Project Area

No resources were identified by the NWIC as being in the Patterson Pass project area.

Five studies have been conducted within or adjacent to portions of the Patterson Pass project area. This entire project area has been studied.

- S-5868, Holman, M. 1983. A Field Archaeological Reconnaissance of a Proposed Wind Farm for the Fields Ranch, Altamont Pass, Alameda County, California (letter report). No resources in the Patterson Pass project area were identified during this study.
- S-6133, Holman, M. 1983. Field Archaeological Reconnaissance of the Proposed Sweet Property Wind Farm (letter report). No resources in the Patterson Pass project area were identified during this study.
- S-6490, Clark, M. 1983. Archaeological Reconnaissance of the Moy Property, Alameda County, California. No resources in the Patterson Pass project area were identified during this study.
- S-11396, BioSystems Analysis, Inc. 1989. Technical Report of Cultural Resources Studies for the Proposed WTG-WEST, Inc., Los Angeles to San Francisco and Sacramento, California: Fiber Optic Cable Project. No resources in the Patterson Pass project area were identified during this study.
- S-17993, Hatoff, B. B. Voss, S. Waechter, S. Wee, and V. Bente. 1995. Cultural Resources Inventory Report for the Proposed Mojave Northward Expansion Project. No resources in the Patterson Pass project area were identified during this study.

Field Survey

A cultural resources field survey is in process to cover those portions of the Golden Hills project area that were not previously covered by the surveys referenced above, but it was not completed at the time of preparation of this EIR.

Archaeological Site Sensitivity

Program Area

Previous studies throughout the program area and eastern Alameda County have documented that prehistoric resources in this area are buried and may have little or no visible surface evidence. Because there is an archaeological district (the Brushy Peak Archaeological District, as described above) adjacent to the program area, that location should be considered sensitive for buried resources.

An additional area of archaeological site sensitivity appears to be in the southeastern portion of the program area. This area contains about 50 known resources, primarily historic-era archaeological. They consist of former town sites, mines and mine shafts, prospect scrapes and rock piles associated with pit mining, historic-era artifact scatters, a variety of corrals, troughs, and historic roads, as well as two rock outcrops. It is therefore possible that additional historic-era archaeological, as well as prehistoric, resources are present within this portion of the program area.

A final area of archaeological site sensitivity appears to be in the middle portion of the program area, along the eastern border in proximity to the Alameda and San Joaquin Counties boundary. This area contains about 15 historic-era archaeological resources, including former ranch and house sites, windmill and farm features, artifact scatters, a historic-era family cemetery, a transmission line, the remains of a reservoir, and four historic-era isolates (glass fragments). It is therefore possible that additional historic-era archaeological resources are present within this portion of the program area.

Project Areas

No resources have been previously recorded in the Patterson Pass project area, and three resources have been previously recorded in the Golden Hills project area. Both project sites have been extensively studied through a variety of reports, including studies for transmission lines and wind resources; cellular tower studies; area-wide inventory reports; and studies for commercial and residential development. Neither project area is considered sensitive for archaeological resources.

Summary of Native American Contact

A letter, submitted by fax, was sent to the Native American Heritage Commission (NAHC) on June 20, 2013. The letter described the program and requested a review of the Sacred Lands Files for the program area. The letter also requested a list of interested Native American tribal groups and individuals who may have concerns pertaining to Native American issues in the program area. The NAHC responded on June 26, 2013, stating that the search failed to indicate the presence of Native American cultural resources in the immediate program area. The NAHC also provided a list of the Native American tribal groups and individuals to be contacted regarding the proposed program.

On June 28, 2013, letters describing the proposed program that included a map of the program area were sent to the following individuals.

- Ann Marie Sayers, Chairperson, Indian Canyon Mutsun Band of Costanoan
- Jakki Kehl
- Katherine Erolinda Perez
- Ramona Garibay, Representative, Trina Marine Ruano Family
- Irene Zwierlein, Chairperson, Amah/Mutsun Tribal Band
- Rosemary Cambra, Chairperson, Muwekma Ohlone Indian Tribe of the San Francisco Bay Area
- Jean-Marie Feyling, Amah/Mutsun Tribal Band
- Tony Cerda, Chairperson, Coastanoan Rumsen Carmel Tribe

Per his request, an email was sent to Andrew Galvan of the Ohlone Indian Tribe. To date, no responses have been received from any of those contacted. Native American consultation is ongoing and will be updated for the final EIR.

Determination of Significance

In accordance with Appendix G of the State CEQA Guidelines, program Alternative 1, program Alternative 2, the Golden Hills Project, or the Patterson Pass Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5.
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.

- Disturb any human remains, including those interred outside of formal cemeteries.
- Directly or indirectly destroy a unique paleontological resource or site or unique geological feature.

Impacts and Mitigation Measures

Where projects are proposed in the program area, a survey and evaluation to identify potential historic resources and a re-evaluation of recorded historic resources would need to be conducted in the project's area of potential effect (APE). The APE would include the properties adjacent to the project area if the project may pose an indirect impact on a historic resource by altering its historic setting. Having a significant impact on the historic integrity of a property by affecting its historic setting is a significant impact on a historic resource. If the APE of a proposed project within the program area contains a historic resource, as defined in the State CEQA Guidelines, and the resource would be substantially adversely changed by the proposed project, the resulting impact would cause a substantial adverse change in the significance of the historic resource.

The program has identified the following construction and operation activities as likely to occur. These activities could result in substantial adverse changes in the significance of historical resources.

1. Temporary meteorological tower installation.
    a. If the construction and operation of the temporary meteorological tower causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.
2. Temporary staging area set-up.
    a. If the construction and operation of the temporary staging area set-up causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.
3. Existing wind turbine removal.
    a. If the removal of an existing wind turbine causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.
4. Temporary meteorological tower removal.
    a. If the removal of the temporary meteorological tower causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.
5. Road infrastructure upgrades.
    a. If an upgrade to the road infrastructure causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.

1) Road infrastructure upgrades may include widening of existing internal roads, widening of entrances to access roads and public roads, and replacement of existing culverts with larger ones.

6. Wind turbine construction.
   a. If the construction of a new wind turbine causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.
      1) Construction of the wind turbines would include new concrete foundations (see #9), batch plant construction (see #7), and crane area construction (see #9). Both the batch plant and crane areas would be reclaimed following the completion of the construction of the wind turbine.
7. Final site selection and preparation.
   a. If the selection and preparation of a site causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.
8. Batch plant construction.
   a. See #6 above. If the construction of a batch plant causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.
9. Foundation excavation and construction.
   a. See #6 above. If the construction and operation of the foundation causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.
10. Crane pad construction.
    a. See #6 above. If the construction of a crane pad construction area causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.
11. Assembly of tower.
    a. If the assembly of the tower causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.
12. Installation of turbine nacelle.
    a. If the installation of turbine nacelles causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.
13. Attachment of rotors.
    a. If the attachment of rotors causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.

14. Collection system upgrades and installation.
    a. If the upgrades and installation of the collection system causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.
15. Communication system installation.
    a. If the installation of the communication system causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.
16. Permanent meteorological tower installation.
    a. If the construction and operation of the permanent meteorological tower causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.
17. Reclamation of landscape.
    a. If the reclamation of landscape causes the demolition, destruction, relocation, or alteration of a historical resource, the proposed project could cause a substantial adverse change in the significance of that historical resource.

Mitigation of significant impacts must lessen or eliminate impacts that a proposed project will have on a historic resource. This can be accomplished through redesign to eliminate objectionable or damaging aspects of the project. Examples include redesigning a project to retain rather than remove a character-defining feature, reducing the massing size of a proposed new addition to the historic setting, or relocating a structure outside the boundaries of a historic setting.

Relocation of a historic resource may constitute an adverse impact on the resource. However, in situations in which relocation is the only feasible alternative to demolition, relocation may mitigate below a level of significance provided that the new location is compatible with the original character and use of the historical resource, and the resource retains its eligibility for listing on the California Register (14 CCR Section 4852(d)(1)).

In most cases, the use of drawings, photographs, or displays does not mitigate the physical impact on the environment caused by demolition or destruction of a historical resource (14 CCR Section 15126.4(b)). However, CEQA requires that all feasible mitigation be undertaken even if it does not mitigate below a level of significance. In this context, recordation serves a legitimate archival purpose. The level of documentation required as mitigation should be proportionate with the level of significance of the resource (California State Parks, Office of Historic Preservation 2013).

Impact CUL-1a-1: Cause a substantial adverse change in the significance of a historical resource—program Alternative 1: 417 MW (less than significant with mitigation)

Nineteen historic architectural resources have been recorded within the program area. There may be more unrecorded historic resources within the area. Some of the historic resources that were recorded may no longer exist or may be too significantly altered to still be considered historic resources, as defined in Section 15064.5 of the State CEQA Guidelines. If the APE of a proposed project within the program area contains a historic resource, as defined in the State CEQA Guidelines, and the resource would be substantially adversely changed by the proposed project, the resulting impact would cause a substantial adverse change in the significance of the historic resource.

Implementation of Mitigation Measure CUL-1a would reduce this impact to a less-than-significant level by amending project design to avoid a significant impact on the historic resource. If avoidance is not feasible, then the impact would be significant. Mitigation Measure CUL-1b would reduce such an impact to a less-than-significant level by recording the historic resource following the documentation standards and guidelines of the National Park Service's (NPS) Historic American Building Survey (HABS) or Historic American Engineering Record (HAER).

Mitigation Measure CUL-1a: Avoid historic resources

Where feasible, avoid historic resources in design and layout of a proposed project in the program area.

Mitigation Measure CUL-1b: Appropriate recordation of historic resources

If Mitigation Measure CUL-1a is determined to be infeasible, the significantly affected historic resource should be recorded following the guidelines of NPS, HABS, or HAER. The recordation documentation must be provided to NPS, the SHPO, and local repositories as determined by Alameda County. The documentation with a HABS or HAER report will include written data, a photography record with large-format rectified photography, and, depending on the level of significance of the resource, an architectural drawing set. The standards for these recordation components are defined in NPS guidance, and the level of recordation is determined by Alameda County in consultation with other lead agencies, if required. There are three standard levels of HABS and HAER recordation defined by the NPS.

Impact CUL-1a-2: Cause a substantial adverse change in the significance of a historical resource—program Alternative 2: 450 MW (less than significant with mitigation)

Nineteen historic architectural resources have been recorded within the program area. There may be more unrecorded historic resources within the area. Some of the historic resources that were recorded may no longer exist or may be too significantly altered to still be considered historic resources, as defined in Section 15064.5 of the State CEQA Guidelines. If the APE of a proposed project within the program area contains a historic resource, as defined in the State CEQA Guidelines, and the resource would be substantially adversely changed by the proposed project, the resulting impact would cause a substantial adverse change in the significance of the historic resource.

Implementation of Mitigation Measure CUL-1a would reduce this impact to a less-than-significant level by amending project design to avoid a significant impact on the historic resource. If avoidance is not feasible, then the impact would be significant. Mitigation Measure CUL-1b would reduce such an impact to a less-than-significant level by recording the historic resource following the documentation standards and guidelines of the National Park Service's (NPS) Historic American Building Survey (HABS) or Historic American Engineering Record (HAER).

Mitigation Measure CUL-1a: Avoid historic resources

Mitigation Measure CUL-1b: Appropriate recordation of historic resources

Impact CUL-1b: Cause a substantial adverse change in the significance of a historic resource—Golden Hills Project (less than significant with mitigation)

The Golden Hills Project may cause a substantial adverse change in the significance of three potential historical resources: P-01-000163/CA-ALA-441H, a historic-era ranch complex consisting of five separate features; P-01-000177/CA-ALA-455H, the Santucci Property Homestead, a historic-era ranch complex with standing buildings; and P-01-010957, the remnants of an abandoned corral. No other features are recorded or were observed during the Google Earth remote reconnaissance survey by the architectural historian in June 2013.

No determination regarding eligibility for inclusion in the CRHR and NRHP has been made for any of the three resources. However, Section 15064.5 states:

> The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register or historical resources, or identified in an historical resources survey does not preclude a lead agency from determining that the resource may be an historical resources as defined in Public Resources Code section 5020.1(j) or 5024.1

Should the proposed project require the demolition, destruction, or alteration of these resources or their immediate surroundings such that the significance of the resource is materially impaired, then a substantial adverse change would result. Implementation of Mitigation Measure CUL-1a would reduce this impact to a less-than-significant level by avoiding the historic resources. If avoidance is infeasible, implementation of Mitigation Measure CUL-1b would be employed. Because the two historic-era ranch properties and the corral are landscape features, a Historic American Landscapes Survey (HALS) would be appropriate documentation to reduce this impact to a less-than-significant level.

Mitigation Measure CUL-1a: Avoid historic resources

Mitigation Measure CUL-1b: Appropriate recordation of historic resources

Impact CUL-1c: Cause a substantial adverse change in the significance of a historic resource—Patterson Pass Project (no impact)

There are no historical resources recorded in any of the three parcels that comprise the Patterson Pass Project. No other features are recorded or were observed during the Google Earth remote reconnaissance survey by the architectural historian in June 2013. There would be no impact.

Impact CUL-2a-1: Cause a substantial adverse change in the significance of an archaeological resource—program Alternative 1: 417 MW (less than significant with mitigation)

As discussed in *Methods for Analysis*, a variety of prehistoric and historic-era archaeological resources are present within the program area. Given the large size of the program area, the moderate to high sensitivity for buried sites (especially near Brushy Peak), and the moderate to high sensitivity for historic archaeological resources towards the eastern and southeastern portions of the program area, there is a possibility of encountering and damaging previously unrecorded archaeological resources during ground-disturbing activities. This impact would be significant, but implementation of Mitigation Measures CUL-2a, 2b, 2c, and 2d would reduce this impact to a less-than-significant level.

Mitigation Measure CUL-2a: Conduct a preconstruction cultural field survey and cultural resources inventory and evaluation

Alameda County will require applicants to retain qualified personnel to conduct an archaeological field survey of the program area to determine whether significant resources exist within the program area. The inventory and evaluation will include the documentation and result of these efforts, the evaluation of any cultural resources identified during the survey, and cultural resources monitoring, if the survey identifies that it is necessary.

Mitigation Measure CUL-2b: Develop a treatment plan for any identified significant cultural resources

If any significant resources are identified through the preconstruction survey, a treatment plan that could include site avoidance, capping, or data recovery will be developed and implemented.

Mitigation Measure CUL-2c: Conduct worker awareness training for archaeological resources prior to construction

Prior to the initiation of any site preparation and/or the start of construction, the project applicant will ensure that all construction workers receive training overseen by a qualified professional archaeologist who is experienced in teaching nonspecialists, to ensure that forepersons and field supervisors can recognize archaeological resources (e.g., areas of shellfish remains, chipped stone or groundstone, historic debris, building foundations, human bone) in the event that any are discovered during construction.

Mitigation Measure CUL-2d: Stop work if cultural resources are encountered during ground-disturbing activities

The project applicant will ensure that construction specifications include a stop-work order if prehistoric or historic-era cultural resources are unearthed during ground-disturbing activities. If such resources are encountered, the project applicant will immediately halt all activity within 100 feet of the find until a qualified archaeologist can assess the significance of the find. Prehistoric materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or tool-making debris; culturally darkened soil ("midden") containing heat-affected rocks and artifacts; stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered-stone tools, such as hammerstones and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse. If the find is determined to be potentially significant, the archaeologist, in consultation with the Native American representative (if appropriate), will develop a treatment plan that could include site avoidance, capping, or data recovery.

Impact CUL-2a-2: Cause a substantial adverse change in the significance of an archaeological resource—program Alternative 2: 450 MW (less than significant with mitigation)

As discussed in *Methods for Analysis*, a variety of prehistoric and historic-era archaeological resources are present within the program area. Given the large size of the program area, the moderate to high sensitivity for buried sites (especially near Brushy Peak), and the moderate to high sensitivity for historic archaeological resources toward the eastern and southeastern portions of the program area, there is a possibility of encountering and damaging previously unrecorded archaeological resources during ground-disturbing activities. This impact would be significant, but implementation of Mitigation Measures CUL-2a, 2b, 2c and 2d would reduce this impact to a less-than-significant level.

Mitigation Measure CUL-2a: Conduct a preconstruction cultural field survey and cultural resources inventory and evaluation

Mitigation Measure CUL-2b: Develop a treatment plan for any identified significant cultural resources

Mitigation Measure CUL-2c: Conduct worker awareness training for archaeological resources prior to construction

Mitigation Measure CUL-2d: Stop work if cultural resources are encountered during ground-disturbing activities

Impact CUL-2b: Cause a substantial adverse change in the significance of an archaeological resource—Golden Hills Project (less than significant with mitigation)

Archaeological resources have been identified in the Golden Hills project area. Damage to these archaeological resources would be a significant impact, but implementation of Mitigation Measures CUL-2a, CUL-2b, CUL-2c, CUL-2d and 2e would reduce this impact to a less-than-significant level.

Mitigation Measure CUL-2a: Conduct a preconstruction cultural field survey and cultural resources inventory and evaluation

Mitigation Measure CUL-2b: Develop a treatment plan for any identified significant cultural resources

Mitigation Measure CUL-2c: Conduct worker awareness training for archaeological resources prior to construction

Mitigation Measure CUL-2d: Stop work if cultural resources are encountered during ground-disturbing activities

Mitigation Measure CUL-2e: Avoid all cultural resources during construction and operation

Avoid archaeological resources in design, layout, construction, and operation of the proposed project.

Impact CUL-2c: Cause a substantial adverse change in the significance of an archaeological resource—Patterson Pass Project (less than significant with mitigation)

Although no cultural resources have been identified in the Patterson Pass project area, there is the possibility of encountering and damaging previously unrecorded archaeological resources during ground-disturbing activities. This impact would be significant, but implementation of Mitigation Measures CUL-2a, 2b, 2c, and 2d would reduce this impact to a less-than-significant level.

Mitigation Measure CUL-2a: Conduct a preconstruction cultural field survey and cultural resources inventory and evaluation

Mitigation Measure CUL-2b: Develop a treatment plan for any identified significant cultural resources

Mitigation Measure CUL-2c: Conduct worker awareness training for archaeological resources prior to construction

Mitigation Measure CUL-2d: Stop work if cultural resources are encountered during ground-disturbing activities

Impact CUL-3a-1: Disturb any human remains, including those interred outside of formal cemeteries—program Alternative 1: 417 MW (less than significant with mitigation)

Although there is no indication that the program area has been used for human burials, because prehistoric sites are known to be present in the program area, the possibility cannot be discounted entirely. Although the possibility is unlikely, human remains could be discovered during ground-disturbing activities. This impact would be significant, but implementation of Mitigation Measure CUL-3 would reduce this impact to a less-than-significant level.

Mitigation Measure CUL-3: Stop work if human remains are encountered during ground-disturbing activities

The project applicant will ensure the construction specifications include a stop-work order if human remains are discovered during construction or demolition. There will be no further excavation or disturbance of the site within a 100-foot radius of the location of such discovery, or any nearby area reasonably suspected to overlie adjacent remains. The Alameda County Coroner will be notified and will make a determination as to whether the remains are Native American. If the Coroner determines that the remains are not subject to his authority, he will notify the Native American Heritage Commission, who will attempt to identify descendants of the deceased Native American. If no satisfactory agreement can be reached as to the disposition of the remains pursuant to this state law, then the landowner will re-inter the human remains and items associated with Native American burials on the property in a location not subject to further subsurface disturbance. A final report will be submitted to Alameda County. This report will contain a description of the mitigation program and its results, including a description of the monitoring and testing resources analysis methodology and conclusions and a description of the disposition/curation of the resources.

Impact CUL-3a-2: Disturb any human remains, including those interred outside of formal cemeteries—program Alternative 2: 450 MW (less than significant with mitigation)

Although there is no indication that the program area has been used for human burials, because prehistoric sites are known to be present in the program area, the possibility cannot be discounted entirely. Although the possibility is unlikely, human remains could be discovered during ground-disturbing activities. This impact would be significant, but implementation of Mitigation Measure CUL-3 would reduce this impact to a less-than-significant level.

Mitigation Measure CUL-3: Stop work if human remains are encountered during ground-disturbing activities

Impact CUL-3b: Disturb any human remains, including those interred outside of formal cemeteries—Golden Hills Project (less than significant with mitigation)

Although there is no indication that the Golden Hills project area has been used for human burials, because prehistoric sites are known to be present, the possibility cannot be discounted entirely.

Although the possibility is unlikely, human remains could be discovered during ground-disturbing activities. This impact would be significant, but implementation of Mitigation Measure CUL-3 would reduce this impact to a less-than-significant level.

Mitigation Measure CUL-3: Stop work if human remains are encountered during ground-disturbing activities

Impact CUL-3c: Disturb any human remains, including those interred outside of formal cemeteries—Patterson Pass Project (less than significant with mitigation)

Although there is no indication that the PPPS has been used for human burials, because prehistoric sites are known to be present in the larger Program area, the possibility cannot be discounted entirely. Although the possibility is unlikely, human remains could be discovered during ground-disturbing activities. This impact would be significant, but implementation of Mitigation Measure CUL-3 would reduce this impact to a less-than-significant level.

Mitigation Measure CUL-3: Stop work if human remains are encountered during ground-disturbing activities

3.5.3 References Cited

Bennyhoff, J. A. 1994a. The Napa District and Wappo Prehistory. In R. E. Hughes (ed.). *Toward a New Taxonomic Framework for Central California Archaeology: Essays by James A. Bennyhoff and David A. Fredrickson*. Pages 49–56. Berkeley, CA: Contributions of the University of California Archaeological Research Facility 52.

———. 1994b. Variation within the Meganos Culture. In R. E. Hughes (ed.). *Toward a New Taxonomic Framework for Central California Archaeology: Essays by James A. Bennyhoff and David A. Fredrickson*. Pages 81–89. Berkeley, CA: Contributions of the University of California Archaeological Research Facility 52.

———. 1994c. A Delta Intrusion to the Bay in the Late Middle Period in Central California. In R. E. Hughes (ed.). *Toward a New Taxonomic Framework for Central California Archaeology: Essays by James A. Bennyhoff and David A. Fredrickson*. Pages 7–13. Berkeley, CA: Contributions of the University of California Archaeological Research Facility 52.

California State Parks, Office of Historic Preservation. 2013. *How Can Substantial Adverse Change be Avoided or Mitigated?* Available: http://ohp.parks.ca.gov/?page_id=21727. Accessed: June 2013.

Cook, S. F. 1943a. The Conflict between the California Indians and White Civilization, I: The Indian Versus the Spanish Mission. *Ibero-Americana 21*. Berkeley, CA.

———. 1943b. The Conflict between the California Indians and White Civilization, II: The Physical and Demographic Reaction of the Non-mission Indians in Colonial and Provincial California. *Ibero-Americana* 22. Berkeley, CA.

Elsasser, A. B. 1978. Development of Regional Prehistoric Cultures. In R. F. Heizer (ed.). *California*. Pages 37–57. Handbook of North American Indians. Vol. 8. Smithsonian Institution, Washington, D.C.

Fentress, J., and A. Guerrero. 2010. *District Record for P-01-011111, the Brushy Peak Archaeological District (East Bay Regional Park District)*. Record on file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.

Fredrickson, D. A. 1994. Changes in Prehistoric Exchange Systems in the Alamo Locality, Contra Costa County, CA. In R. E. Hughes (ed.). *Toward a New Taxonomic Framework for Central California Archaeology: Essays by James A. Bennyhoff and David A. Fredrickson*. Pages 57–64. Contributions of the University of California Archaeological Research Facility 52.

Groza, R. G. 2002. *An AMS Chronology for Central California* Olivella *Shell Beads*. Master's thesis. Department of Anthropology, California State University, San Francisco.

Hylkema, M. G. (ed.). 2007. *Santa Clara Valley Prehistory: Archaeological Investigations at CA-SCL-690, the Tamien Station Site, San Jose, California*. Originally prepared for: California Department of Transportation, Office of Environmental Planning, South, District 4, Oakland, CA. University of California, Davis: Center for Archaeological Research at Davis Publication no. 15.

Ingram, B. L. 1998. Differences in Radiocarbon Age Between Shell and Charcoal from a Holocene Shellmound in Northern California. *Quaternary Research* 49:102–110.

Kroeber, A. L. 1925. *Handbook of the Indians of California.* Bureau of American Ethnology Bulletin 78. Smithsonian Institution, Washington, D.C. Reprinted 1976 by Dover Publications, NY.

Levy, R. 1978. Costanoan. In R. F. Heizer (ed.). *California*. Pages 485–495. Handbook of North American Indians. Vol. 8. Smithsonian Institution, Washington, D.C.

Milliken, R. 1995. *A Time of Little Choice.* Ballena Press, Menlo Park, CA.

Milliken, R., R. T. Fitzgerald, M. G. Hylkema, R. Groza, T. Origer, D. G. Bieling, A. Leventhal, R. S. Wiberg, A. Gottsfield, D. Gillette, V. Bellifemine, E. Strother, R. Cartier, and D. A. Fredrickson. 2007. Chapter 8: Punctuated Culture Change in the San Francisco Bay Area. In Jones, Terry L., and Kathryn A. Klar (eds.). *California Prehistory: Colonization, Culture, and Complexity*. Pages 99–123. Lanham, MD: AltaMira Press.

Nelson, N.C. 1909. Shellmounds of the San Francisco Bay Region. *University of California Publications in American Archaeology and Ethnology* 7(4):309–356.

Newland, M., and K. Erickson. 2010. *Primary Record for P-01-011054, the Tesla Complex*. Record on file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA.

Rosenthal, J., and J. Meyer. 2004. Landscape Evolution and the Archaeological Record: A Geoarchaeological Study of the Southern Santa Clara Valley and Surrounding Region. *Center for Archaeological Research at Davis Publication No. 14*. Davis, CA.

Schenck, W. E. 1926. Historic Aboriginal Groups of the California Delta Region. *University of California Publications in American Archaeology and Ethnology* 23(2):123–146. Berkeley, CA.

Wallace, W. J., and D. W. Lathrop. 1975. West Berkeley (CA-ALA-307): A Culturally Stratified Shellmound on the East Shore of San Francisco Bay. *Contributions of the University of California Archaeological Research Facility* 29.

Wiberg, R. S. 1996. *Archaeological Investigations and Burial Removal at Sites CA-ALA-483, CA-ALA-483 Extension, and CA-ALA-555, Pleasanton, Alameda County, California*. Holman and Associates, San Francisco. Submitted to Davidon Homes, Walnut Creek. Copies available from Northwest Information Center, Sonoma State University, Rohnert Park, CA.

3.6 Geology, Soils, Mineral Resources, and Paleontological Resources

This section describes the regulatory and environmental setting for geology, soils, mineral resources, and paleontological resources in the program and project areas. It also describes impacts on geology, soils, mineral resources, and paleontological resources that would result from implementation of the program and two individual projects. Mitigation measures are prescribed where feasible and appropriate.

3.6.1 Existing Conditions

Regulatory Setting

Federal

No federal regulations apply to mineral resources or paleontological resources in the APWRA. The following federal regulations are related to geologic hazards or soils.

International Building Code

The design and construction of engineered facilities in California must comply with the requirements of the International Building Code (IBC) (International Code Council 2011) and the adoptions of that code by the State of California (see *California Building Standards Code* under *State Regulations*).

U.S. Geological Survey Landslide Hazard Program

To fulfill the requirements of Public Law 106-113, the U.S. Geological Survey created the National Landslide Hazards Program to reduce long-term losses from landslide hazards by improving understanding of the causes of ground failure and suggesting mitigation strategies. The Federal Emergency Management Agency is the responsible agency for the long-term management of natural hazards.

Clean Water Act Section 402 (National Pollutant Discharge Elimination System Program)

Section 402 of the Clean Water Act (CWA) mandates that certain types of construction activity comply with the requirements of EPA's National Pollutant Discharge Elimination System (NPDES) program. EPA has delegated to the State Water Board the authority for the NPDES program in California, where it is implemented by the state's nine Regional Water Boards. Construction activity disturbing 1 acre or more must obtain coverage under the state's General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order 2010-0014-DWQ). (See *Construction Activities Storm Water Construction General Permit [2010-0014-DWQ Permit]*).

Additional details of the CWA are described in Section 3.9, *Hydrology and Water Quality*.

State

Alquist-Priolo Earthquake Fault Zoning Act

California's Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (Public Resources Code [PRC] Section 2621 et seq.) is intended to reduce risks to life and property from surface fault rupture during earthquakes. The Alquist-Priolo Act prohibits the location of most types of structures intended for human occupancy[1] across the traces of active faults and strictly regulates construction in the corridors along active faults capable of surface rupture or fault creep (earthquake fault zones). Generally the required setback is 50 feet from an active fault trace. The act also defines criteria for identifying active faults, giving legal weight to terms such as *active*, and establishes a process for reviewing building proposals in and adjacent to earthquake fault zones.

Under the Alquist-Priolo Act, faults are zoned, and construction along or across them is strictly regulated if they are *sufficiently active* and *well defined*. A fault is considered sufficiently active if one or more of its segments or strands shows evidence of surface displacement during Holocene time (defined for purposes of the act as referring to approximately the last 11,000 years). A fault is considered well-defined if its trace can be identified clearly by a trained geologist at the ground surface, or in the shallow subsurface using standard professional techniques, criteria, and judgment (Bryant and Hart 2007).

Seismic Hazards Mapping Act

Like the Alquist-Priolo Act, the Seismic Hazards Mapping Act of 1990 (PRC Sections 2690–2699.6) is intended to reduce damage resulting from earthquakes. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong ground shaking, liquefaction, and seismically induced landslides. Its provisions are similar in concept to those of the Alquist-Priolo Act—the state is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other corollary hazards; and cities and counties are required to regulate development within mapped seismic hazard zones.

Under the Seismic Hazards Mapping Act, permit review is the primary mechanism for local regulation of development. Specifically, cities and counties are prohibited from issuing development permits for sites within seismic hazard zones until appropriate site-specific geologic and/or geotechnical investigations have been carried out and measures to reduce potential damage have been incorporated into the development plans. Geotechnical investigations conducted within seismic hazard zones must incorporate standards specified by California Geological Survey Special Publication 117a, *Guidelines for Evaluating and Mitigating Seismic Hazards in California* (California Geological Survey 2008).

Construction Activities Storm Water Construction General Permit (2010-0014-DWQ Permit)

Dischargers whose projects disturb 1 or more acres of soil, or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the General Permit Order 2010-0014-DWQ. Construction activity

[1] With reference to the Alquist-Priolo Act, a *structure for human occupancy* is defined as one "used or intended for supporting or sheltering any use or occupancy, which is expected to have a human occupancy rate of more than 2,000 person-hours per year" (California Code of Regulations, Title 14, Div. 2, Section 3601[e]).

subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

Coverage under the General Permit is obtained by submitting permit registration documents to the State Water Board that include a risk level assessment and a site-specific stormwater pollution prevention plan (SWPPP) identifying an effective combination of erosion control, sediment control, and non-stormwater BMPs. The General Permit requires that the SWPPP define a program of regular inspections of the BMPs and, in some cases, sampling of water quality parameters. The San Francisco Bay Regional Water Quality Control Board administers the NPDES stormwater permit program in Alameda County. The 14 cities, the unincorporated area, and the two flood control districts of Alameda County share one NPDES permit that is managed through a consortium of agencies called the Alameda Countywide Clean Water Program.

2010 California Building Standards Code

The California Building Standards Code (CBSC) (24 California Code of Regulations) provides the minimum standards for structural design and construction. The CBSC is based on the IBC, which is used widely throughout United States (generally adopted on a state-by-state or district-by-district basis) and has been modified for California conditions with numerous, more detailed or more stringent regulations. The CBSC requires that "classification of the soil at each building site will be determined when required by the building official" and that "the classification will be based on observation and any necessary test of the materials disclosed by borings or excavations." In addition, the CBSC states that "the soil classification and design-bearing capacity will be shown on the (building) plans, unless the foundation conforms to specified requirements." The CBSC provides standards for various aspects of construction, including (i.e., not limited to) excavation, grading, and earthwork construction; fills and embankments; expansive soils; foundation investigations; and liquefaction potential and soil strength loss. In accordance with California law, certain aspects of the program would be required to comply with all provisions of the CBSC.

The CBSC requires extensive geotechnical analysis and engineering for grading, foundations, retaining walls, and other structures, including criteria for seismic design.

California Surface Mining and Reclamation Act of 1975

The principal legislation addressing mineral resources in California is the Surface Mining and Reclamation Act of 1975 (SMARA) (PRC Sections 2710–2719), which was enacted in response to land use conflicts between urban growth and essential mineral production. The stated purpose of SMARA is to provide a comprehensive surface mining and reclamation policy that will encourage the production and conservation of mineral resources while ensuring that adverse environmental effects of mining are prevented or minimized; to ensure that mined lands are reclaimed and residual hazards to public health and safety are eliminated; and to give consideration to recreation, watershed, wildlife, aesthetic, and other related values. SMARA governs the use and conservation of a wide variety of mineral resources, although some resources and activities are exempt from its provisions, including excavation and grading conducted for farming, construction, or recovery from flooding or other natural disaster.

SMARA provides for the evaluation of an area's mineral resources using a system of Mineral Resource Zone (MRZ) classifications that reflect the known or inferred presence and significance of a given mineral resource. The MRZ classifications are based on available geologic information, including geologic mapping and other information on surface exposures, drilling records, and mine data, and on socioeconomic factors such as market conditions and urban development patterns. The MRZ classifications are defined as follows.

- **MRZ-1**—areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.
- **MRZ-2**—areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood for their presence exists.
- **MRZ-3**—areas containing mineral deposits, the significance of which cannot be evaluated from available data.
- **MRZ-4**—areas where available information is inadequate for assignment into any other MRZ.

Although the State of California is responsible for identifying areas containing mineral resources, the county or city is responsible for SMARA implementation and enforcement by providing annual mining inspection reports and coordinating with the California Geological Survey (CGS).

Mining activities that disturb more than 1 acre or involve excavation of at least 1,000 cubic yards of material require a SMARA permit from the lead agency, which is the county, city, or board that is responsible for ensuring that adverse environmental effects of mining are prevented or minimized. The lead agency establishes its own local regulations and requires a mining applicant to obtain a surface mining permit, submit a reclamation plan, and provide financial assurances pursuant to SMARA.

Certain land-disturbing activities do not require a permit, such as excavation related to farming, grading related to restoring the site of a natural disaster, and grading related to construction.

California Public Resources Code

Several sections of the California Public Resources Code protect paleontological resources. Section 5097.5 prohibits “knowing and willful” excavation, removal, destruction, injury, and defacement of any paleontological feature on public lands (lands under state, county, city, district, or public authority jurisdiction, or the jurisdiction of a public corporation), except where the agency with jurisdiction has granted express permission. Section 30244 requires reasonable mitigation for impacts on paleontological resources that occur as a result of development on public lands.

Local

The policies and regulations of the county government that address issues related to geology, such as seismic hazards, slope stability, and erosion, and mineral resources are found in the Alameda General Plan, the ECAP, the Alameda County Code of Ordinances, and the Alameda County Stormwater Management Plan and are described below. There are no general plan policies related to paleontological resources.

Alameda County General Plan

The Safety Element of the Alameda County General Plan specifies numerous policies and action to meet its relevant goal, which is, “To minimize risks to lives and property due to seismic and geologic hazards.” These policies and actions are listed below (Alameda County Community Development Agency 2013).

Policies

P1. To the extent possible, projects should be designed to accommodate seismic shaking and should be sited away from areas subject to hazards induced by seismic shaking (landsliding, liquefaction, lurking, etc.) where design measures to mitigate the hazards will be uneconomic or will not achieve a satisfactory degree of risk reduction.

P2. Structures should be located at an adequate distance away from active fault traces, such that surface faulting is not an unreasonable hazard.

P3. Aspects of all development in hillside areas, including grading, vegetation removal and drainage, should be carefully controlled in order to minimize erosion, disruption to natural slope stability, and landslide hazards.

P4. Within areas of demonstrated or potential slope instability, development should be undertaken with caution and only after existing geological and soil conditions are known and considered. In areas subject to possible widespread major landsliding, only very low density development should be permitted, consistent with site investigations; grading in these areas should be restricted to minimal amounts required to provide access.

P5. All existing structures or features of structures which are hazardous in terms of damage, threat to life or loss of critical and essential function in the event of an earthquake should be, to the extent feasible, brought into conformance with applicable seismic and related safety (fire, toxic materials storage and use) standards through rehabilitation, reconstruction, demolition, or the reduction in occupancy levels or change in use.

P6. The County shall not approve new development in areas with potential for seismic and geologic hazards unless the County can determine that feasible measures will be implemented to reduce the potential risk to acceptable levels, based on site-specific analysis. The County shall review new development proposals in terms of the risk caused by seismic and geologic activity.

P7. The County, prior to approving new development, shall evaluate the degree to which the development could result in loss of lives or property, both within the development and beyond its boundaries, in the event of a natural disaster.

P8. The County shall ensure that new major public facilities, including emergency response facilities (e.g., hospitals and fire stations), and water storage, wastewater treatment and communications facilities, are sited in areas of low geologic risk.

P9. Site specific geologic hazard assessments, conducted by a licensed geologist 21, shall be completed prior to development approval in areas with landslide and liquefaction hazards as indicated in Figures S-2 and S-4 and for development proposals submitted in Alquist-Priolo Zones as indicated in Figure S-1, hazards to be mapped include:

- Seismic features
- Landslide potential
- Liquefaction potential

Mitigation measures needed to reduce the risk to life and property from earthquake induced hazards should be included.

P10. Buildings shall be designed and constructed to withstand ground shaking forces of a minor earthquake (1–4 magnitude) without damage, of a moderate (5 magnitude) earthquake without structural damage, and of a major earthquake (6–8 magnitude) without collapse of the structure. The County shall require that critical facilities and structures (e.g., hospitals, emergency operations centers) be designed and constructed to remain standing and functional following an earthquake.

P11. All construction in unincorporated areas shall conform to the Alameda County Building Ordinance, which specifies requirements for the structural design of foundations and other building elements within seismic hazard areas.

P12. To the extent feasible, major infrastructure including transportation, pipelines, and water and natural gas mains, shall be designed to avoid or minimize crossings of active fault traces and to accommodate fault displacement without major damage that could result in long-term service disruptions.

P13. The County shall encourage the retrofitting of existing structures and other seismically unsafe buildings and structures to withstand earthquake ground-shaking.

P14. In order to minimize off-site impacts of hillside development, new construction on landslide-prone or potentially unstable slopes shall be required to implement drainage and erosion control provisions to avoid slope failure and mitigate potential hazards.

Actions

A1. Require all new construction to meet the most current, applicable, lateral force requirements.

A2. Require applications for development within Alquist-Priolo Study Zones to include geological data that the subject property is not traversed by an active or potentially active fault, or that an adequate setback can be maintained between the fault trace and the proposed new construction.

A3. Require sites to be developed in accordance with recommendations contained in the soil and geologic investigations reports.

A4. Establish standards for areas previously in Alquist-Priolo Study Zones, and eliminated in the last update.

A5. Regulate, with collaboration from utility owners, the extension of utility lines in fault zones.

A6. Establish (with collaboration from utility owners) and enforce design standards for transportation facilities and underground utility lines to be located in fault zones.

A7. Require soils and/or geologic reports for development proposed in areas of erodible soils and potential slope instability.

A8. Pursue programs to identify and correct existing structural hazards, with priority given to hazards in critical, essential and high occupancy structures and in structures built prior to the enactment of applicable local or state earthquake design standards.

A9. Support regional or statewide programs providing funding or technical assistance to local governments to allow identification of existing structural hazards in private development and providing assistance to public and private sectors to facilitate and to minimize the social and economic costs of hazards abatement.

A10. Continue to require the upgrading of buildings and facilities to achieve compliance with current earthquake bracing requirements as a condition of granting building permits for major additions and repairs.

A11. Continue, and as required, expand programs to provide the public information regarding seismic hazards and related structural hazards.

A12. Require geotechnical studies prior to development approval in geologic and/or seismic hazard areas as identified by future studies by federal, state, and regional agencies. Require or undertake comprehensive geologic and engineering studies for critical structures regardless of location.

A13. Adopt and amend as needed the most current version of the California Building Code (CBC) to ensure that new construction and renovation projects incorporate Earthquake-resistant design and materials that meet or exceed the current seismic engineering standards of the CBC.

A14. Periodically update detailed guidelines for preparation of site-specific geologic hazard assessments. These guidelines shall be prepared in consultation with the County Building Official, County Engineer, County Counsel and the County Risk Manager and shall ensure that site-specific assessments for development requiring discretionary permits are prepared according to consistent criteria.

A15. Develop and implement an earthquake retrofit plan to reduce hazards from earthquakes. The plan should identify and tally the seismically unsafe buildings and structures, including unreinforced masonry, unreinforced concrete and soft-story buildings, and require inspection for these structures. It should also identify sources of funding to help reconstruct or replace inadequate structures and assist homeowners with earthquake retrofitting.

A16. On sites with slopes greater than 30 percent, require all development to be clustered outside of the 30 percent slope area, with the exception that development upon any area outside of the Urban Growth Boundary where the slope exceeds 25% shall not be permitted.

A17. Aspects of all development in hillside areas, including grading, vegetation removal and drainage, should be carefully controlled in order to minimize erosion, disruption to natural slope stability, and landslide hazards. The County's development standards and guidelines, permit application review process, Section 15.08.240 of its Building Ordinance, the Grading Erosion and Sediment Control Ordinance (Chapter 15.36 of the Alameda County General Ordinance Code), the Stormwater Management and Discharge Control Ordinance (Chapter 13.08), and Subdivision Ordinance (Title 16) shall serve to implement this policy.

Alameda County Code of Ordinances

In the Code of Ordinances, Chapter 15.08, *Building Code*, the County sets forth requirements for new construction in areas affected by seismic and geologic hazards. The code requires that the project proponent submit soil and geotechnical reports before the County will permit construction of a foundation. In addition, Chapter 15.36, *Grading Erosion and Sediment Control*, known as the grading ordinance, sets forth requirements for grading, construction, and the control of erosion and sediments in order to safeguard human health and property, protect waterways, and ensure that the graded site is prepared in accordance with the general plan.

Alameda County Stormwater Management Plan

The Alameda County Clean Water Program's (ACCWP) Stormwater Management Plan for unincorporated Alameda County is discussed in Section 3.9, *Hydrology and Water Quality*.

Alameda County East County Area Plan

The ECAP sets forth the following goals, policies, and implementation programs to minimize the risks related to seismic hazards (Alameda County 2000) and open space.

Hazard Zones

Goal: To minimize the risks to lives and property due to environmental hazards.

Policy 134: The County shall not approve new development in areas with potential **natural hazards** (flooding, geologic, wildland fire, or other environmental hazards) unless the County can determine that feasible measures will be implemented to reduce the potential risk to acceptable levels, based on site-specific analysis.

Policy 135: The County, prior to approving new development, shall evaluate the degree to which the development could result in loss of lives or property, both within the development and beyond its boundaries, in the event of a **natural disaster**.

Environmental Hazards

Soil and Slope Stability

Goal: To minimize the risks to lives and property due to soil and slope instability hazards.

Policy 307: The County shall encourage Zone 7, cities, and agricultural groundwater users to limit the withdrawal of groundwater in order to minimize the potential for **land subsidence**.

Policy 308: The County shall not permit development within any area outside the Urban Growth Boundary exceeding 25 percent slopes to minimize hazards associated with slope instability.

Seismic and Geologic Hazards

Goal: To minimize the risks to lives and property due to seismic and geologic hazards.

Policy 309: The County shall not approve new development in areas with potential for seismic and geologic hazards unless the County can determine that feasible measures will be implemented to reduce the potential risk to acceptable levels, based on site-specific analysis. The County shall review new development proposals in terms of the risk caused by seismic and geologic activity.

Policy 310: The County, prior to approving new development, shall evaluate the degree to which the development could result in loss of lives or property, both within the development and beyond its boundaries, in the event of a **natural disaster.**

Policy 311: The County shall ensure that new major public facilities, including emergency response facilities (e.g., hospitals and fire stations), and water storage, wastewater treatment and communications facilities, are sited in areas of low geologic risk.

Policy 312: The County shall ensure that major transportation facilities and pipelines are designed, to the extent feasible, to avoid or minimize crossings of active fault traces and to accommodate fault displacement without major damage that could result in long-term disruption of service.

Policy 313: The County shall require development in **hilly areas** to minimize potential erosion and disruption of natural slope stability which could result from grading, vegetation removal, irrigation, and drainage.

Policy 314: The County shall prohibit the construction of any structure intended for human occupancy within 50 feet on either side of the Calaveras, Greenville, or Verona earthquake fault zones as defined by the Alquist-Priolo Earthquake Fault Zoning Act.

Policy 315: The County shall require that buildings be designed and constructed to withstand groundshaking forces of a minor earthquake without damage, of a moderate earthquake without structural damage, and of a major earthquake without collapse of the structure. The County shall require that critical facilities and structures (e.g., hospitals, emergency operations centers) be designed and constructed to remain standing and functional following an earthquake.

Implementation Programs:

Program 111: The County shall delineate areas within East County where the potential for geologic hazards (including seismic hazards, landslides, and liquefaction) warrants preparation of detailed site specific geologic hazard assessments. Areas shall be delineated based upon data from published sources and field investigations. Maps shall be maintained and updated as new data become available. These maps shall not be used by the County to determine where hazardous conditions exist, but instead to identify the presence of conditions which warrant further study.

Program 112: The County shall develop detailed guidelines for preparation of site-specific geologic hazard assessments. These guidelines shall be prepared in consultation with the County Building Official, the County Engineer, County Geologist, County Counsel, and the County Risk

Manager, and shall ensure that site-specific assessments for development requiring discretionary permits are prepared according to consistent criteria.

General Open Space

Goal: To protect regionally significant open space and agricultural land from development

Policy 52: The County shall preserve open space areas for the protection of public health and safety, provision of recreational opportunities, production of natural resources (e.g., agriculture, wind power, and mineral extraction), protection of sensitive viewsheds, preservation of biological resources, and the physical separation between neighboring communities.

Environmental Setting

Topography

The program area is located in the Altamont Hills in the Diablo Range of the Coast Ranges. The Altamont Hills are situated between the eastern edge of Livermore Valley and the western edge of the San Joaquin Valley. Elevations in the program area range from approximately 100 feet above mean sea level (msl) on the far northeastern side of the program area to more than 2,100 feet above msl in the south. The topography in the project areas varies but overall is steep, with generally more smooth, rounded hills and ridges in the northern portion of the program area and steeper, more sharp-crested terrain in the southern portion of the program area.

The topography of the two project areas is summarized below.

- Golden Hills Project—The northern portion of the Golden Hills project area is in the more rounded hills of the program area, and elevations range from approximately 200 to 700 feet above msl. The southern portion of the project area is in the steeper terrain of the program area, and elevations here range from 500 to nearly 1,600 feet above msl.
- Patterson Pass Project—The Patterson Pass project area is the central portion of the program area in fairly steep, sharp-crested terrain. Elevations range from approximately 700 to 2,000 feet above msl.

Geology

Regional

The program area is in the east-central portion of California's Coast Ranges geomorphic province (e.g., Norris and Webb 1990: 359–363; California Geological Survey 2002: 3). The Coast Ranges province is characterized by en echelon (i.e., parallel to subparallel) northwest-trending mountain ranges formed by active uplift related to complex tectonics of the San Andreas fault/plate boundary system (Norris and Webb 1990: 359–380).

The eastern Coast Ranges are broadly antiformal (i.e., fold is convex, with oldest geologic units in the core). At the general latitude of the program area, they consist of a central *core* of Mesozoic units—primarily the Cretaceous Panoche Formation—flanked on the east by an upward younging sequence of marine and terrestrial sedimentary units that include the San Pablo Formation, a Miocene fanglomerate, and Quaternary alluvial deposits (Wagner et al. 1991).

Local

The bedrock geology of the program vicinity is shown in Figure 3.6-1. Graymer et al. have divided the geology of Alameda County into nine stratigraphic assemblages, each of which is a fault-bounded block. Two of these assemblages, VI and XI, occur in the program area. A description of these assemblages, rather than the individual geologic units, is provided here because of the large extent of the program area.

Assemblage VI makes up most of the program area. This assemblage is bounded by the Greenville fault to the west and the Carnegie fault to the south. The northern half of the assemblage is made up of the Great Valley Sequence, which consists primarily of sandstone and interbedded sandstone and shale of Cretaceous age. The southern half of the assemblage is made up of massive marine sandstone and basal conglomerate of the late Miocene Cierbo Sandstone (Tc) and Neroly Formation (Tn) (California Geological Survey 2009a: 27–30). The Cierbo Sandstone is a light gray to white, thick-bedded, fine- to coarse-grained, moderately consolidated, quartz sandstone. In some locations it contains abundant mollusk fossils. The Neroly Sandstone is a blue sandstone with minor conglomerate (Graymer et al. 1996: 12).

Assemblage XI is a wedge-shaped block in the southwest corner of the program area, bounded by the Carnegie fault to north and the Greenville fault to the west. Most of this assemblage is made up of Miocene sedimentary deposits, primarily the Neroly sandstone and Tesla Formation. The Tesla Formation is a marine to brackish water sandstone. The extreme southern edge of the assemblage in the program area is made up the sandstones of the Great Valley Sequence (California Geological Survey 2009a: 27–30).

The geology of the two project areas is summarized below.

- Golden Hills Project—In the northern portion of the Golden Hills project area, the geologic unit exposed at the surface is a Cretaceous sandstone (Kd on Figure 3.6-1). In the southern portion of the project area, the units exposed are a Cretaceous shale in the center (Kcu), the Cretaceous sandstone (Kd) to the west and east of the shale, the Miocene Cierbo sandstone (Tc) to the west and east of the Cretaceous sandstone, and the Miocene Neroly Formation (Tn) on the eastern edge of the Cierbo Sandstone.
- Patterson Pass Project—The geologic units exposed at the surface in the Patterson Pass project area are the Cretaceous shale (Kcu on Figure 3.6-1) to the north, the Miocene Cierbo Sandstone (Tc) in the center, and the Miocene Neroly Formation (Tn) to the south.

Seismicity

Primary Seismic Hazards

The State of California considers two aspects of earthquake events as primary seismic hazards: surface fault rupture (i.e., visual disruption of the Earth's surface as a result of fault activity) and seismic ground shaking.

Surface Fault Rupture

There is a risk of surface rupture in the program area because two active faults (the Marsh Creek section of the Greenville fault zone and the Corral Hollow-Carnegie fault zone) occur in the program area. In addition, another active fault (the Los Positas fault) is just west of the program area. Alameda County is in a seismically active region and Alquist-Priolo earthquake fault zone maps have been prepared for much of the county (California Geological Survey 2007). One of these maps covers the western portion of the program area, which is in an Alquist-Priolo earthquake fault zone. Two active faults have been mapped as part of this study: the Greenville fault zone (California Division of Mines and Geology 1982), specifically the Marsh Creek-Greenville section, and the Los Positas fault (Figure 3.6-2). The Greenville fault zone is a northwest trending strike-slip fault zone that is approximately 30 miles long, extending from the Tassajara quadrangle (just north of Livermore quadrangle) to the Eylar quadrangle (in Santa Clara County) along the western side of the Diablo Range (California Division of Mines and Geology 1981: 3; Bryant and Cluett 2002: 1; California Geological Survey 2007). The Marsh Creek section of the Greenville fault occurs on the western edge of the program area. The fault is active, with some segments having been active historically (including portions that showed minor rupture during the Livermore Valley quake in 1980) and other segments active in the last 11,000 to 15,000 years (California Geological Survey 2010; Bryant and Cluett 2002: 1) (Figure 3.6-2). The Los Positas fault is an east-west trending fault just west of the APWRA that has been active in the last 200 years (California Division of Mines and Geology 1981).

The third active fault in the program area is the Corral Hollow-Carnegie fault zone, portions of which have been active in the last 15,000 years (California Geological Survey 2010; U.S. Geological Survey 2013a) (Figure 3.6-2).

It should also be noted that the Midway fault extends through the eastern edge of the program area. Although the U.S. Geological Survey (USGS) Quaternary Fault Database (2013b) and California Geological Survey (2010) designate this fault as potentially active (i.e., experienced movement in the last 130,000 years), rather than active (i.e., experienced movement in the last 11,000 years), work conducted by Unruh and Krug (2007:17) for the USGS concluded "that the Midway fault is an active structure that primarily accommodates strike-slip displacement."

The surface fault rupture potential of the two project areas is summarized below.

- Golden Hills Project—Although no portion of the Golden Hills project area is within an Alquist-Priolo earthquake fault zone or near a segment of a fault designated as active, a portion of the Golden Hills project area does overlie a segment of the Corral Hollow-Carnegie fault zone designated as Quaternary undifferentiated (i.e., the date of the most recent rupture has not been determined) (California Geological Survey 2010) (Figure 3.6-2). This occurs at the northern end of the fault trace. The Marsh Creek section of the Greenville fault zone is near the Golden Hills project area, but the project area does not cross or come within 50 feet of this fault zone.
- Patterson Pass Project—No portion of the Patterson Pass project area is located near a Quaternary fault trace.

Seismic Ground Shaking

Unlike surface rupture, ground shaking is not confined to the trace of a fault, but rather ground shaking propagates into the surrounding areas during an earthquake. The intensity of ground shaking typically diminishes with distance from the fault, but ground shaking may be locally amplified and/or prolonged by some types of substrate materials. These factors are used to map the probabilistic shaking hazards throughout the state.

Based on the probabilistic seismic hazard map, which depicts the peak horizontal ground acceleration values exceeded at a 10% probability in 50 years (California Geological Survey 2003; Cao et al. 2003), the probabilistic peak horizontal ground acceleration values for the program area range from 0.2g to 0.5g (where g equals the acceleration of gravity) (Figure 3.6-3). As a point of comparison, probabilistic peak horizontal ground acceleration values for the San Francisco Bay Area range from 0.4g to more than 0.8g. The acceleration value for the program area indicates a moderate ground-shaking hazard (Figure 3.6-3).

The main source of strong ground shaking is the Greenville fault zone, which has experienced movement as recently as 1980 during the Livermore Valley earthquake (Figure 3.6-2). The Greenville fault zone extends along the eastern edge of the Livermore Valley and is considered to be part of the larger San Andreas fault system (Bryant and Cluett 2002: 1). Other active faults in the project vicinity include the Hayward-Rogers Creek fault, the Los Positas fault (associated with the Greenville fault), and the Calaveras fault.

The seismic ground-shaking potential of the two project areas is summarized below.

- Golden Hills Project—The probabilistic peak horizontal ground acceleration values for the Golden Hills project area range from 0.2g to 0.5g—the same as for the entire program area.
- Patterson Pass Project— The probabilistic peak horizontal ground acceleration values for the Patterson Pass project area also range from 0.2g to 0.5g, with most of the project area in the higher end of the shaking intensity range.

Secondary Seismic Hazards

Secondary seismic hazards are seismically induced landslide, liquefaction, and related types of ground failure events. As discussed in *Regulatory Setting* in Section 3.6.1, *Existing Conditions*, the State of California maps areas that are subject to secondary seismic hazards pursuant to the Seismic Hazards Mapping Act. These hazards are addressed briefly below based on available information.

Landslide and Other Slope Stability Hazards

Several square miles on the western side of the program area are in earthquake-induced landslide hazard zones (California Geological Survey 2009a, 2000b) (Figure 3.6-4). These zones are designated as a Zone of Required Investigation for landslide hazard by the State of California.

According to the California Geological Survey (2009b: Section 2, page 25):

> Earthquake-induced landslide zone maps are intended to prompt more detailed, site-specific geotechnical investigations as required by the Act. As such, these zone maps identify areas where the potential for earthquake-induced landslides is relatively high. Due to limitations in methodology, it should be noted that these zone maps do not necessarily capture all potential earthquake-induced landslide hazards. Earthquake-induced ground failures that are not addressed by this map include those associated with ridge-top spreading and shattered ridges. It should also be noted that no attempt has been made to map potential run-out areas of triggered landslides. It is possible that run out areas extend beyond the zone boundaries.

The landslide zones tend to be concentrated in areas where the slopes are steeper and/or rock strengths are weaker. Numerous historically active landslides occur along the Greenville fault. Many of the moderate to large rockslides are underlain by the Miocene units of the Neroly Sandstone (Tn), Oro Loma Formation (Tol), and Tesla Formation (Tte), and also the Cierbo Sandstone (Tc) but to a lesser extent. Steep slopes and proximity to faults appear to be the predominant causes of landsliding in the area (California Geological Survey 2009a: v and Section 2, pages 31–32).

Although the remainder of the program area is not in an earthquake-induced landslide hazard zone (California Geological Survey 2007), several factors make slope instability (both seismically and nonseismically induced) a concern in this area. These factors include the steep topography, the potential for moderate ground shaking, and the proximity to areas designated as landslide hazard zones. In addition, slope stability related to precipitation is also factor in the program area (see *Slope Stability [Nonseismic-Related]* below).

Liquefaction and Related Ground Failure

Liquefaction is the process in which soils and sediments lose shear strength and fail during seismic ground shaking. The vibration caused by an earthquake can increase pore pressure in saturated materials. If the pore pressure is raised to be equivalent to the load pressure, this causes a temporary loss of shear strength, allowing the material to flow as a fluid. This temporary condition can result in severe settlement of foundations and slope failure. The susceptibility of an area to liquefaction is determined largely by the depth to groundwater and the properties (e.g., grain size, density, degree of consolidation) of the soil and sediment within and above the groundwater. The sediments most susceptible to liquefaction are saturated, unconsolidated sand and silt within 40 feet of the ground surface. According to the CGS report prepared for the adjacent Altamont quadrangle, CGS evaluations focus on areas covered by Quaternary (less than about 1.6 million years) sedimentary deposits (California Geological Survey 2009a : Section1, pages 2–4). Improperly compacted artificial fill may also be susceptible to liquefaction.

Although a portion of the program area is in a seismic hazard zone (California Geological Survey 2007), no liquefaction hazard zones are mapped in the program area (Figure 3.6-4). Because the depth to groundwater in the foothills, which are outside the groundwater basin, is generally greater than 60 feet (California Geological Survey 2009a: Section 1, page 9), the liquefaction hazard in the program area is likely low. In addition, the ages of the rock units in the APWRA are generally Tertiary and Cretaceous, which are older than most liquefiable sediments. However, landslide deposits may be less consolidated and, therefore, more susceptible to liquefaction.

Other types of ground failure related to liquefaction include lateral spreading and differential settlement. Lateral spreading is a failure of soil/sediment within a nearly horizontal zone that causes the soil to move toward a free face (such as a streambank or canal) or down a gentle slope. Lateral spreading can occur on slopes as gentle as 0.5%. Even a relatively thin layer of liquefiable sediment can create planes of weakness that could cause continuous lateral spreading over large areas (California Geological Survey 2008: 36).

The potential for lateral spreading in the project area is unknown.

Differential settlement—the uneven settling of soil—is the most common fill displacement hazard (California Geological Survey 2008: 56). The potential for differential settlement is unknown because its determination requires site-specific testing.

Slope Stability (Nonseismic-Related)

Nonseismic-related landsliding is common in the APWRA.

In 1998, heavy rainfall caused widespread landsliding in the 10-county San Francisco Bay region. As a result, USGS geologists conducted a landslide inventory of the affected counties, including Alameda County. Figure 3.6-5 shows the landslides that were mapped in and near the program area, including one very near the Patterson Pass project area. However, because of the extent of the landsliding, only landslides associated with damage to the built environment were mapped (U.S. Geological Survey 1999: 2 and map). Because the program area is in a rural area, many landslides are not shown.

In addition, the wide extent of landsliding in and around the program area is further exemplified by the omission of landslides from the bedrock geologic map of Alameda County "because they are so numerous they would conceal much of the information on bedrock geology" (Graymer et al. 1996:6).

Soils

Because the program area is large, the soils are best described at a landscape scale, rather than at a detailed scale. Natural Resources Conservation Service maps soils at a landscape scale by mapping soil associations. Soil associations are groupings of individual soils that occur together in a repeating pattern on the landscape and are typically named after the two or three dominant soil series.

Several soil associations occur in the program area (Figure 3.6-6). Table 3.6-1 summarizes important issues of concern related to suitability for construction. The primary issue of concern is the shrink-swell potential of the soils (i.e., linear extensibility or expansiveness). Many of the soils that make up the Fontana-Diablo-Altamont soil association, which occurs over most of the program area, have a high shrink-swell potential. Several other minor soil associations also have a high shrink-swell potential.

The soil associations of the two project areas are summarized below.

- Golden Hills Project—All of the Golden Hills project area is underlain by the Fontana-Diablo-Altamont soil association. As described in Table 3.6-1, two construction issues associated with the soils in this association are high shrink-swell potential and susceptibility to water erosion.
- Patterson Pass Project—Much of the Patterson Pass project area is also underlain by the Fontana-Diablo-Altamont soil association. In addition, the southeastern portion of the project area is underlain by the Carbona-Calla soil association. Some soils in this association have a high shrink-swell potential (Table 3.6-1).

Table 3.6-1. General Characteristics of Soil Associations in the Program Area

Map Symbol	Soil Association	Location and Characteristics
s697	San Ysidro-Rincon	Occurs in northeast corner of program area. Some soils in this association are susceptible to wind erosion.
s694	Fontana-Diablo-Altamont	Dominant soil association in program area; occurs over most of the area. Most soils in this association have a high shrink-swell potential. Some soils in this association have a higher susceptibility to water erosion.
s863	Carbona-Capay-Calla	Occurs in the east-central edge of program area. All soils in this association have a moderate to high shrink-swell potential.
s864	Carbona-Calla	Occurs in the east-central portion of program area. Most soils in this association have a moderate to very high shrink-swell potential.
s792	Wisflat-Badland-Arburua	Small area occurs in the southeast edge of program area. Several soils in this association have a high shrink-swell potential. Some soils in this association have a higher susceptibility to water erosion.
s892	Vallecitos-Honker-Gonzaga-Franciscan	Small area occurs in the south edge of program area. Most soils in this association have a moderate to high shrink-swell potential.
s970	Vallecitos-Parrish-Los Gatos-Gaviota	Small area occurs in the southwest edge of program area. Most soils in this association have a moderate to high shrink-swell potential.

Source: Natural Resources Conservation Service 2006.

Mineral Resources

There are no known mineral resources in the program area. According to the California Division of Mines and Geology land classification map prepared for the South San Francisco Bay Production-Consumption (P-C) Region, which includes Alameda County, there no areas designated as MRZ-2 (Kohler-Antablin 1996: viii and Plate 17). No mining is known to occur in the area. In addition, the general plan does not identify mineral resources in the program area.

Paleontological Resources

Paleontological sensitivity is a qualitative assessment based on the paleontological potential of the stratigraphic units present, the local geology and geomorphology, and other factors relevant to fossil preservation and potential yield. According to the Society of Vertebrate Paleontology (SVP) (2010), standard guidelines for sensitivity are (1) the potential for a geological unit to yield abundant or significant vertebrate fossils or to yield a few significant fossils, large or small, vertebrate, invertebrate, or paleobotanical remains and (2) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecological, or stratigraphic data (Table 3.6-2).

Table 3.6-2. Paleontological Sensitivity Ratings

Potential	Definition
High	Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources…Paleontological potential consists of both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data.
Undetermined	Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources.
Low	Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus, will only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule.
No	Some rock units, such as high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites), have no potential to contain significant paleontological resources. Rock units with no potential require neither protection nor impact mitigation measures relative to paleontological resources.

Source: Society of Vertebrate Paleontology 2010.

Because of the large area of the program area and the many geologic units that occur in that area, it is not possible to make a determination of the sensitivity for paleontological resources of each unit. However, most of the geologic units in the APWRA are likely highly sensitive for paleontological resources, based primarily on rock type. Both assemblages in the APWRA (see discussion under *Geology*) are made up of sedimentary rocks, such as sandstone and shale. These rocks, in general, have a high potential to contain paleontological resources. In addition, some of these units are known to contain fossils. For example, the University of California Museum of Paleontology (UCMP) database contains four records of mammal fossils in the Neroly Formation (University of California Museum of Paleontology 2013a). Another example is the Great Valley Sequence, which contains units with a diverse assemblage of invertebrates, plus marine reptiles and numerous types of plants (Paleo Portal 2013).

It should also be noted that the UCMP database contains 1,241 records of vertebrate fossils in Alameda County. However, most of these records are from geologic units not found in the program area. (University of California Museum of Paleontology 2013b).

The paleontological resources of the two project areas is summarized below.

- Golden Hills Project—The Golden Hills project area is underlain by Cretaceous and Miocene sedimentary units with potential to contain sensitive paleontological resources. These units include Cretaceous sandstone and shale (Kd and Kcu on Figure 3.6-1), the Miocene Cierbo Sandstone (Tc), and the Miocene Neroly Formation (Tn).

- Patterson Pass Project—The Patterson Pass project area is also underlain by Cretaceous and Miocene sedimentary units with potential to contain sensitive paleontological resources. These units include Cretaceous shale (Kcu on Figure 3.6-1), the Miocene Cierbo Sandstone (Tc), and the Miocene Neroly Formation (Tn).

3.6.2 Environmental Impacts

The impacts associated with the exposure of the program and two individual projects to the existing known geologic and soil hazards, mineral resources, and paleontological resources are discussed below. Mitigation measures are provided, where appropriate.

Methods for Analysis

Evaluation of the geology and soil impacts in this section is based on information from published maps, reports, and other documents that describe the geologic, seismic, soil, and mineral resource conditions of the program area, and on professional judgment. The analysis assumes that the project proponents will conform to the latest CBSC standards, county general plan seismic safety standards, county grading ordinance, and NPDES requirements.

The primary source of information used in developing the paleontological resources section is the paleontological database at the University of California, Berkeley. Effects on paleontological resources were analyzed qualitatively on a large-scale level, based on professional judgment and the SVP guidelines below.

SVP's *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* provides standard guidelines that are widely followed (Society of Vertebrate Paleontology 2010). These guidelines reflect the accepted standard of care for paleontological resources. The SVP guidelines identify two key phases in the process for protecting paleontological resources from project impacts.

- Assess the likelihood that the area contains significant nonrenewable paleontological resources that could be directly or indirectly impacted, damaged, or destroyed as a result of the project.
- Formulate and implement measures to mitigate potential adverse impacts.

An important strength of SVP's approach to assessing potential impacts on paleontological resources is that the SVP guidelines provide some standardization in evaluating paleontological sensitivity. Table 3.6-3 defines the SVP's sensitivity categories for paleontological resources and summarizes SVP's recommended treatments to avoid adverse effects in each sensitivity category.

No new field work, research, or engineering level design was conducted for the preparation of this EIR.

Table 3.6-3. Society of Vertebrate Paleontology's Recommended Treatment for Paleontological Resources

Sensitivity Category	Mitigation Treatment
High or Undetermined	• An intensive field survey and surface salvage prior to earthmoving, if applicable. • Monitoring by a qualified paleontological resource monitor of excavations. • Salvage of unearthed fossil remains and/or traces (e.g., tracks, trails, burrows). • Screen washing to recover small specimens, if applicable. • Preliminary survey and surface salvage before construction begins. • Preparation of salvaged fossils to a point of being ready for curation (i.e., removal of enclosing matrix, stabilization and repair of specimens, and construction of reinforced support cradles where appropriate). • Identification, cataloging, curation, and provision for repository storage of prepared fossil specimens. • A final report of the finds and their significance.
Low or no	Rock units with low or no potential typically will not require impact mitigation measures to protect fossils.

Source: Society of Vertebrate Paleontology 2010.

Determination of Significance

In accordance with Appendix G of the State CEQA Guidelines, program Alternative 1, program Alternative 2, the Golden Hills project, or the Patterson Pass project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving any of the following.
  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault. (Refer to Division of Mines and Geology Special Publication 42).
  - Strong seismic ground shaking.
  - Seismic-related ground failure, including liquefaction.
  - Landslides.
- Result in substantial soil erosion or the loss of topsoil.
- Be located on expansive soil, creating substantial risks to life or property.
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?
- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

The program would not include installation of septic systems or alternative wastewater disposal. Therefore this topic was dismissed from further discussion during the scoping period and there is no need to address impacts related to this CEQA checklist criterion.

In addition, the program would not affect mineral resources because there are no known mineral resources in the program area and no mining is known to occur in the area. Therefore, there is no need to address impacts related to this CEQA checklist criterion.

Impacts and Mitigation Measures

Impact GEO-1a-1: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of rupture of a known earthquake fault—program Alternative 1: 417 MW (less than significant with mitigation)

Placement of a turbine or power collection system on or near a fault could result in damage or destruction of the turbine. If a turbine were constructed on or near a fault, rupture of that fault could damage a turbine or cause harm to personnel on the site. The turbine could be damaged or collapse and possibly injure personnel or property in the immediate area.

Two active faults, two of which are zoned under the Alquist-Priolo Act, are present in the program area. In addition, a third, the Midway fault, though designated only as potentially active, also occurs in the program area. Rupture of a fault and the subsequent damage and harm that could result would be a significant impact.

A portion of the Greenville fault zone in the program area is a Special Studies Zone; however, because the turbines are not designed for human occupancy, they are not regulated by the Alquist-Priolo Act. The County would nevertheless require geotechnical investigation before the County approves construction near the Greenville and Corral Hollow-Carnegie fault zones because they are designated as active by the state. However, this may not address all seismic-related safety issues and may not apply to the Midway fault, which is designated as potentially active by the state. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could be located on or near a fault trace that ruptures and causes damage to or collapse of the turbine or collection system.

This impact would be significant, but implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Prior to construction activities at any site, the project proponent will retain a geotechnical firm with local expertise in geotechnical investigation and design to prepare a site-specific geotechnical report. This report will be prepared by a licensed geotechnical engineer or engineering geologist and will be submitted to the County building department as part of the approval process. This report will be based on data collected from subsurface exploration, laboratory testing of samples, and surface mapping and will address the following issues.

- Potential for surface fault rupture and turbine site location: The geotechnical report will investigate the Greenville, Corral Hollow-Carnegie, and the Midway faults (as appropriate to the location) and determine whether they pose a risk of surface rupture. Turbine foundations and power collection systems will be sited according to recommendations in this report.
- Strong ground shaking: The geotechnical report will analyze the potential for strong ground shaking in project area and provide turbine foundation design recommendations, as well as recommendations for power collection systems.
- Slope failure: The geotechnical report will investigate the potential for slope failure (both seismically and nonseismically induced) and develop site-specific turbine foundation and power collection system plans engineered for the terrain, rock and soil types, and other conditions present at the program area in order to provide long-term stability.
- Expansive soils: The geotechnical report will assess the soil types in the program area and determine the best engineering designs to accommodate the soil conditions.
- Unstable cut or fill slopes: The geotechnical report will address geologic hazards related to the potential for grading to create unstable cut or fill slopes and make site-specific recommendations related to design and engineering.

Impact GEO-1a-2: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of rupture of a known earthquake fault—program Alternative 2: 450 MW (less than significant with mitigation)

Placement of a turbine or power collection system on or near a fault could result in damage or destruction of the turbine. If a turbine were constructed on or near a fault, rupture of that fault could damage a turbine or cause harm to personnel on the site. The turbine could be damaged or collapse and possibly injure personnel or property in the immediate area.

Two active faults, two of which are zoned under the Alquist-Priolo Act, are present in the program area. In addition, a third, the Midway fault, though designated only as potentially active, also occurs in the program area. Rupture of a fault and the subsequent damage and harm that could result would be a significant impact.

A portion of the Greenville fault zone in the program area is a Special Studies Zone; however, because the turbines are not designed for human occupancy, they are not regulated by the Alquist-Priolo Act. The County would nevertheless require geotechnical investigation before the County approves construction near the Greenville and Corral Hollow-Carnegie fault zones because they are designated as active by the state. However, this may not address all seismic-related safety issues and may not apply to the Midway fault, which is designated as potentially active by the state. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could be located on or near a fault trace that ruptures and causes damage to or collapse of the turbine or collection system.

This impact would be significant, but implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-1b: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of rupture of a known earthquake fault—Golden Hills Project (less than significant with mitigation)

Placement of a turbine or power collection system on or near a fault could result in damage or destruction of the turbine. If a turbine were constructed on or near a fault, rupture of that fault could damage a turbine or cause harm to personnel on the site. The turbine could be damaged or collapse and possibly injure personnel or property in the immediate area.

A portion of the Golden Hills project area overlies a segment of the Corral Hollow-Carnegie fault zone designated as Quaternary undifferentiated (i.e., the date of the most recent rupture has not been determined). As discussed under Impact GEO-1a-1 and GEO-1a-2, if a turbine were constructed on or near a fault, rupture of that fault could damage a turbine or cause harm to personnel on the site. The turbine could be damaged or collapse and possibly injure personnel or property in the immediate area. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could be located on or near a fault trace that ruptures and causes damage to or collapse of the turbine or collection system.

This impact would be significant, but implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-1c: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of rupture of a known earthquake fault—Patterson Pass Project (less than significant)

Placement of a turbine or power collection system on or near a fault could result in damage or destruction of the turbine. If a turbine were constructed on or near a fault, rupture of that fault could damage a turbine or cause harm to personnel on the site. The turbine could be damaged or collapse and possibly injure personnel or property in the immediate area.

There are no active fault traces in or near the Patterson Pass project area. Therefore, construction of the project would be unlikely to expose people or structures to potential substantial adverse effects as a result of rupture of a known fault. This impact would be less than significant. No mitigation is required.

Impact GEO-2a-1: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of strong seismic ground shaking—program Alternative 1: 417 MW (less than significant with mitigation)

Construction of turbines or power collection systems in areas with potential to experience strong ground shaking could expose people or structures to potential substantial adverse effects. If turbine foundations were not properly designed to withstand the appropriate level of ground shaking, they could fail and cause damage to or collapse of the turbine towers. This damage or collapse could cause harm to personnel or property in the immediate area.

The program area is in a seismically active area, with the potential for moderately strong ground shaking from sources such as the Greenville fault and the Calaveras fault. The potential damage and harm that could result from moderately strong ground shaking would be a significant impact.

Both the State of California and Alameda County have stringent building safety requirements, and all construction would have to comply with the CBSC. However, this may not address all seismic-related safety issues. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could fail during strong ground shaking and cause damage to or collapse of the turbine or collection system.

This impact would be significant, but implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-2a-2: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of strong seismic ground shaking—program Alternative 2: 450 MW (less than significant with mitigation)

Construction of turbines or power collection systems in areas with potential to experience strong ground shaking could expose people or structures to potential substantial adverse effects. If turbine foundations were not properly designed to withstand the appropriate level of ground shaking, they could fail and cause damage to or collapse of the turbine towers. This damage or collapse could cause harm to personnel or property in the immediate area.

The program area is in a seismically active area, with the potential for moderately strong ground shaking from sources such as the Greenville fault and the Calaveras fault. The potential damage and harm that could result from moderately strong ground shaking would be a significant impact.

Both the State of California and Alameda County have stringent building safety requirements, and all construction would have to comply with the CBSC. However, this may not address all seismic-related safety issues. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could fail during strong ground shaking and cause damage to or collapse of the turbine or collection system.

This impact would be significant, but implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-2b: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of strong seismic ground shaking—Golden Hills Project (less than significant with mitigation)

Construction of turbines or power collection systems in areas with potential to experience strong ground shaking could expose people or structures to potential substantial adverse effects. If turbine foundations were not properly designed to withstand the appropriate level of ground shaking, they could fail and cause damage to or collapse of the turbine towers. This damage or collapse could cause harm to personnel or property in the immediate area.

The range of shaking intensity in the Golden Hills project area extends across all shaking intensities experienced in the program area, from low to high. The potential damage and harm that could result from moderately strong ground shaking would be a significant impact.

Both the State of California and Alameda County have stringent building safety requirements, and all construction would have to comply with the CBSC. However, this may not address all seismic-related safety issues. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could fail during strong ground shaking and cause damage to or collapse of the turbine or collection system.

Implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-2c: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of strong seismic ground shaking—Patterson Pass Project (less than significant with mitigation)

Construction of turbines or power collection systems in areas with potential to experience strong ground shaking could expose people or structures to potential substantial adverse effects. If turbine foundations were not properly designed to withstand the appropriate level of ground shaking, they could fail and cause damage to or collapse of the turbine towers. This damage or collapse could cause harm to personnel or property in the immediate area.

The range of shaking intensity in the Patterson Pass project area is on the higher end of shaking intensities experienced in the program area. The potential damage and harm that could result from moderately strong ground shaking would be a significant impact.

Both the State of California and Alameda County have stringent building safety requirements, and all construction would have to comply with the CBSC. However, this may not address all seismic-related safety issues. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could fail during strong ground shaking and cause damage to or collapse of the turbine or collection system.

Implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-3a-1: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of seismic-related ground failure, including landsliding and liquefaction—program Alternative 1: 417 MW (less than significant with mitigation)

Construction of turbines or power collection systems in areas with potential to experience seismic-related ground failure, such as landsliding, liquefaction, lateral spread, and differential settlement, could expose people or structures to potential substantial adverse effects. If turbine foundations or power collection systems were not properly designed and sited for the earthquake-induced ground failure conditions present at the program area, they could fail and cause damage to or collapse of the turbine towers or collection system. This damage or collapse could cause harm to personnel or property in the immediate area.

The program area is known to be susceptible to earthquake-induced landsliding and the southwestern portion of the program area is in a state-designated earthquake-induced landslide hazard zone (Figure 3.6-4). In addition, although the potential for liquefaction is likely low because of the depth to groundwater and the age of the geologic units in the program area, the risk of lateral spread and differential settlement is unknown. The potential damage and harm that could result from landsliding, lateral spread, or differential settlement would be a significant impact.

Both the State of California and Alameda County have stringent building safety requirements, and all construction would have to comply with the CBSC. However, this may not address all seismic-related ground failure issues. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could fail as a result of landsliding, lateral spread, or differential settlement and cause damage to or collapse of the turbine or collection system.

This impact would be significant, but implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-3a-2: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of seismic-related ground failure, including landsliding and liquefaction—program Alternative 2: 450 MW (less than significant with mitigation)

Construction of turbines or power collection systems in areas with potential to experience seismic-related ground failure, such as landsliding, liquefaction, lateral spread, and differential settlement, could expose people or structures to potential substantial adverse effects. If turbine foundations or power collection systems were not properly designed and sited for the earthquake-induced ground failure conditions present at the program area, they could fail and cause damage to or collapse of the turbine towers or collection system. This damage or collapse could cause harm to personnel or property in the immediate area.

The program area is known to be susceptible to earthquake-induced landsliding and the southwestern portion of the program area is in a state-designated earthquake-induced landslide hazard zone (Figure 3.6-4). In addition, although the potential for liquefaction is likely low because of the depth to groundwater and the age of the geologic units in the program area, the risk of lateral spread and differential settlement is unknown. The potential damage and harm that could result from landsliding, lateral spread, or differential settlement would be a significant impact.

Both the State of California and Alameda County have stringent building safety requirements, and all construction would have to comply with the CBSC. However, this may not address all seismic-related ground failure issues. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could fail as a result of landsliding, lateral spread, or differential settlement and cause damage to or collapse of the turbine or collection system.

This impact would be significant, but implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-3b: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of seismic-related ground failure, including landsliding and liquefaction—Golden Hills Project (less than significant with mitigation)

Construction of turbines or power collection systems in areas with potential to experience seismic-related ground failure, such as landsliding, liquefaction, lateral spread, and differential settlement, could expose people or structures to potential substantial adverse effects. If turbine foundations or power collection systems were not properly designed and sited for the earthquake-induced ground failure conditions present at the project area, they could fail and cause damage to or collapse of the turbine towers or collection system. This damage or collapse could cause harm to personnel or property in the immediate area.

The southwestern portion of the Golden Hills project area is in a state-designated earthquake-induced landslide hazard zone and the remaining area is in an area known to be susceptible to landsliding (Figure 3.6-4). In addition, although the potential for liquefaction is likely low because of the depth to groundwater and the age of the geologic units in the program area, the risk of lateral spread and differential settlement is unknown. The potential damage and harm that could result from landsliding, lateral spread, or differential settlement would be a significant impact.

Both the State of California and Alameda County have stringent building safety requirements, and all construction would have to comply with the CBSC. However, this may not address all seismic-related ground failure issues. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could fail as a result of landsliding, lateral spread, or differential settlement and cause damage to or collapse of the turbine or collection system.

This impact would be significant, but implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-3c: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of seismic-related ground failure, including landsliding and liquefaction—Patterson Pass Project (less than significant with mitigation)

Construction of turbines or power collection systems in areas with potential to experience seismic-related ground failure, such as landsliding, liquefaction, lateral spread, and differential settlement, could expose people or structures to potential substantial adverse effects. If turbine foundations or power collection systems were not properly designed and sited for the earthquake-induced ground failure conditions present at the project area, they could fail and cause damage to or collapse of the turbine towers or collection system. This damage or collapse could cause harm to personnel or property in the immediate area.

The Patterson Pass project area is in an area known to be susceptible to landsliding. In addition, although the potential for liquefaction is likely low because of the depth to groundwater and the age of the geologic units in the program area, the risk of lateral spread and differential settlement is unknown. The potential damage and harm that could result from landsliding, lateral spread, or differential settlement would be a significant impact.

Both the State of California and Alameda County have stringent building safety requirements, and all construction would have to comply with the CBSC. However, this may not address all seismic-related ground failure issues. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could fail as a result of landsliding, lateral spread, or differential settlement and cause damage to or collapse of the turbine or collection system.

This impact would be significant, but implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-4a-1: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of landsliding—program Alternative 1: 417 MW (less than significant with mitigation)

In addition to the seismic-related ground failure described in Impact GEO-3a-1 and GEO-3a-2, construction of turbines or power collection systems in areas with potential to experience nonseismic-related landsliding caused by heavy precipitation could also expose people or structures to potential substantial adverse effects. If turbine foundations or power collection systems were not properly designed and sited for the landsliding conditions present at the program area, they could fail and cause damage to or collapse of the turbine towers or collection system. This damage or collapse could cause harm to personnel or property in the immediate area.

The program area is in steep, hilly terrain in an area known to be susceptible to landsliding. The potential damage and harm that could result from landsliding would be a significant impact.

Both the State of California and Alameda County have stringent building safety requirements, and all construction would have to comply with the CBSC. However, this may not address all seismic-related landsliding issues. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could fail as a result of landsliding and cause damage to or collapse of the turbine or collection system.

This impact would be significant, but implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-4a-2: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of landsliding—program Alternative 2: 450 MW (less than significant with mitigation)

In addition to the seismic-related ground failure described in Impact GEO-3a-1 and GEO-3a-2, construction of turbines or power collection systems in areas with potential to experience nonseismic-related landsliding caused by heavy precipitation could also expose people or structures to potential substantial adverse effects. If turbine foundations or power collection systems were not properly designed and sited for the landsliding conditions present at the program area, they could fail and cause damage to or collapse of the turbine towers or collection system. This damage or collapse could cause harm to personnel or property in the immediate area.

The program area is in steep, hilly terrain in an area known to be susceptible to landsliding. The potential damage and harm that could result from landsliding would be a significant impact.

Both the State of California and Alameda County have stringent building safety requirements, and all construction would have to comply with the CBSC. However, this may not address all seismic-related landsliding issues. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could fail as a result of landsliding and cause damage to or collapse of the turbine or collection system.

This impact would be significant, but implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-4b: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of landsliding—Golden Hills Project (less than significant with mitigation)

In addition to the seismic-related ground failure described in impact GEO-3b, construction of turbines or power collection systems in areas with potential to experience nonseismic-related landsliding caused by heavy precipitation could also expose people or structures to potential substantial adverse effects. If turbine foundations or power collection systems were not properly designed and sited for the landsliding conditions present at the project area, they could fail and cause damage to or collapse of the turbine towers or collection system. This damage or collapse could cause harm to personnel or property in the immediate area.

The program area, including the Golden Hills project area, is in steep, hilly terrain in an area known to be susceptible to landsliding. The potential damage and harm that could result from landsliding would be a significant impact.

Both the State of California and Alameda County have stringent building safety requirements, and all construction would have to comply with the CBSC. However, this may not address all seismic-related landsliding issues. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could fail as a result of landsliding and cause damage to or collapse of the turbine or collection system.

This impact would be significant, but implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-4c: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death as a result of landsliding—Patterson Pass Project (less than significant with mitigation)

In addition to the seismic-related ground failure described in impact GEO-3c, construction of turbines or power collection systems in areas with potential to experience nonseismic-related landsliding caused by heavy precipitation could also expose people or structures to potential substantial adverse effects. If turbine foundations or power collection systems were not properly designed and sited for the landsliding conditions present at the project area, they could fail and cause damage to or collapse of the turbine towers or collection system. This damage or collapse could cause harm to personnel or property in the immediate area.

The program area, including the Patterson Pass project area, is in steep, hilly terrain in an area known to be susceptible to landsliding. The potential damage and harm that could result from landsliding would be a significant impact.

Both the State of California and Alameda County have stringent building safety requirements, and all construction would have to comply with the CBSC. However, this may not address all seismic-related landsliding issues. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could fail as a result of landsliding and cause damage to or collapse of the turbine or collection system.

This impact would be significant, but implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-5a-1: Result in substantial soil erosion or the loss of topsoil—program Alternative 1: 417 MW (less than significant)

Ground-disturbing earthwork associated with construction of the proposed program may increase soil erosion rates. These activities, which include excavation, grading, trenching, compaction, and road widening, would cause surface disturbance and vegetation removal during turbine foundation construction and power collection system and communication lines installation and, to a lesser extent, during preparation and decommissioning of the staging areas. As a result, soil would be exposed to rain and wind, potentially causing accelerated erosion, thereby resulting in significant impacts. In addition, if decommissioned sites were left unvegetated, the bare ground could be exposed to accelerated erosion.

Most soils in the program area are covered by grasses. Most unvegetated areas are associated with roads.

To address construction-related erosion, an approved SWPPP, as required by the applicable Regional Water Board, is required when a project involves 1 acre or more of disturbance. A SWPPP specifies BMPs that would prevent construction pollutants from contacting stormwater with the intent of keeping all products of erosion from moving offsite into receiving waters. Compliance with the federal and local erosion-related regulations applicable to the proposed program (i.e., the SWPPP that is developed for the site and the requirements of the county's Stormwater Quality Management Plan) would ensure that the construction activities do not result in significant erosion and that impacts would be reduced to a less-than-significant level.

To address erosion of decommissioned sites, as described in Chapter 2, *Program Description*, decommissioned sites will be regraded and seeded to preproject conditions (unless leaving certain roadways or footings is deemed to be more protective of natural resources than removal). The project applicants will develop a reclamation plan in coordination with the County, USFWS, and CDFW. The reclamation plan will be completed and approved by the County 6 months in advance of project decommissioning. Compliance with the reclamation plan would ensure that decommissioned sites do not result in significant erosion and that impacts would be reduced to a less-than-significant level.

Impact GEO-5a-2: Result in substantial soil erosion or the loss of topsoil—program Alternative 2: 450 MW (less than significant)

Ground-disturbing earthwork associated with construction of the proposed program may increase soil erosion rates. These activities, which include excavation, grading, trenching, compaction, and road widening, would cause surface disturbance and vegetation removal during turbine foundation construction and power collection system and communication lines installation and, to a lesser extent, during preparation and decommissioning of the staging areas. As a result, soil would be exposed to rain and wind, potentially causing accelerated erosion, thereby resulting in significant impacts.

Most soils in the program area are covered by grasses. Most unvegetated areas are associated with roads.

An approved SWPPP, as required by the applicable Regional Water Board, is required when a project involves 1 acre or more of disturbance. A SWPPP specifies BMPs that would prevent construction pollutants from contacting stormwater with the intent of keeping all products of erosion from moving offsite into receiving waters. Compliance with the federal and local erosion-related regulations applicable to the proposed program (i.e., the SWPPP that is developed for the site and the requirements of the county's Stormwater Quality Management Plan) would ensure that the construction activities do not result in significant erosion and that impacts would be reduced to a less-than-significant level.

To address erosion of decommissioned sites, as described in Chapter 2, *Program Description*, decommissioned sites will be regraded and seeded to preproject conditions (unless leaving certain roadways or footings is deemed to be more protective of natural resources than removal). The project applicants will develop a reclamation plan in coordination with the County, USFWS, and CDFW. The reclamation plan will be completed and approved by the County 6 months in advance of project decommissioning. Compliance with the reclamation plan would ensure that decommissioned sites do not result in significant erosion and that impacts would be reduced to a less-than-significant level.

Impact GEO-5b: Result in substantial soil erosion or the loss of topsoil—Golden Hills Project (less than significant)

Ground-disturbing earthwork associated with construction of the proposed project may increase soil erosion rates. These activities, which include excavation, grading, trenching, compaction, and road widening, would cause surface disturbance and vegetation removal during turbine foundation construction and power collection system and communication lines installation and, to a lesser extent, during preparation and decommissioning of the staging areas. As a result, soil would be exposed to rain and wind, potentially causing accelerated erosion, thereby resulting in significant impacts.

Most soils in the project area are covered by grasses. Most unvegetated areas are associated with roads.

An approved SWPPP, as required by the applicable Regional Water Board, is required when a project involves 1 acre or more of disturbance. A SWPPP specifies BMPs that would prevent construction pollutants from contacting stormwater with the intent of keeping all products of erosion from moving offsite into receiving waters. Compliance with the federal and local erosion-related regulations applicable to the proposed program (i.e., the SWPPP that is developed for the site and the requirements of the county's Stormwater Quality Management Plan) would ensure that the construction activities do not result in significant erosion and that impacts would be reduced to a less-than-significant level.

To address erosion of decommissioned sites, as described in Chapter 2, *Program Description*, decommissioned sites will be regraded and seeded to preproject conditions (unless leaving certain roadways or footings is deemed to be more protective of natural resources than removal). The project applicants will develop a reclamation plan in coordination with the County, USFWS, and CDFW. The reclamation plan will be completed and approved by the County 6 months in advance of project decommissioning. Compliance with the reclamation plan would ensure that decommissioned sites do not result in significant erosion and that impacts would be reduced to a less-than-significant level.

Impact GEO-5c: Result in substantial soil erosion or the loss of topsoil—Patterson Pass Project (less than significant)

Ground-disturbing earthwork associated with construction of the proposed project may increase soil erosion rates. These activities, which include excavation, grading, trenching, compaction, and road widening, would cause surface disturbance and vegetation removal during turbine foundation construction and power collection system and communication lines installation and, to a lesser extent, during preparation and decommissioning of the staging areas. As a result, soil would be exposed to rain and wind, potentially causing accelerated erosion, thereby resulting in significant impacts.

Most soils in the project area are covered by grasses. Most unvegetated areas are associated with roads.

An approved SWPPP, as required by the applicable Regional Water Board, is required when a project involves 1 acre or more of disturbance. A SWPPP specifies BMPs that would prevent construction pollutants from contacting stormwater with the intent of keeping all products of erosion from moving offsite into receiving waters. Compliance with the federal and local erosion-related regulations applicable to the proposed program (i.e., the SWPPP that is developed for the site and the requirements of the county's Stormwater Quality Management Plan) would ensure that the construction activities do not result in significant erosion and that impacts would be reduced to a less-than-significant level.

To address erosion of decommissioned sites, as described in Chapter 2, *Program Description*, decommissioned sites will be regraded and seeded to preproject conditions (unless leaving certain roadways or footings is deemed to be more protective of natural resources than removal). The project applicants will develop a reclamation plan in coordination with the County, USFWS, and CDFW. The reclamation plan will be completed and approved by the County 6 months in advance of project decommissioning. Compliance with the reclamation plan would ensure that decommissioned sites do not result in significant erosion and that impacts would be reduced to a less-than-significant level.

Impact GEO-6a-1: Be located on expansive soil, creating substantial risks to life or property—program Alternative 1: 417 MW (less than significant with mitigation)

Turbine foundations built on expansive soils would be subject to the expansion and contraction of these soils, which could cause damage to structures if the subsoil, drainage, and foundation are not properly engineered. The metrological tower and underground systems would be subject to the same expansion and contraction.

Expansive soils occur in much of the program area, particularly in the Fontana-Diablo-Altamont soil association. However, soil sampling and treatment procedures are addressed by state and local building codes. Compliance with these codes and implementation of Mitigation Measure GEO-1 would ensure that this is a less-than-significant impact.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-6a-2: Be located on expansive soil, creating substantial risks to life or property—program Alternative 2: 450 MW (less than significant with mitigation)

Turbine foundations built on expansive soils would be subject to the expansion and contraction of these soils, which could cause damage to structures if the subsoil, drainage, and foundation are not properly engineered. The metrological tower and underground systems would be subject to the same expansion and contraction.

Expansive soils occur in much of the program area, particularly in the Fontana-Diablo-Altamont soil association. However, soil sampling and treatment procedures are addressed by state and local building codes. Compliance with these codes and implementation of Mitigation Measure GEO-1 would ensure that this is a less-than-significant impact.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-6b: Be located on expansive soil, creating substantial risks to life or property—Golden Hills Project (less than significant with mitigation)

Turbine foundations built on expansive soils would be subject to the expansion and contraction of these soils, which could cause damage to structures if the subsoil, drainage, and foundation are not properly engineered.

The Golden Hills project area is underlain by the Fontana-Diablo-Altamont soil association, which contains soils with high shrink-swell potential. However, soil sampling and treatment procedures are addressed by state and local building codes. Compliance with these codes and implementation of Mitigation Measure GEO-1 would ensure that this is a less-than-significant impact.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-6c: Be located on expansive soil, creating substantial risks to life or property—Patterson Pass Project (less than significant with mitigation)

Turbine foundations built on expansive soils would be subject to the expansion and contraction of these soils, which could cause damage to structures if the subsoil, drainage, and foundation are not properly engineered.

The Patterson Pass project area is underlain by the Fontana-Diablo-Altamont and the Carbona-Calla soil associations, which both contain soils with high shrink-swell potential. However, soil sampling and treatment procedures are addressed by state and local building codes. Compliance with these codes and implementation of Mitigation Measure GEO-1 would ensure that this is a less-than-significant impact.

Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-7a-1: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature—program Alternative 1: 417 MW (less than significant with mitigation)

If fossils are present in the program area, they could be damaged by during earth-disturbing activities during construction activities, such as excavation for foundations, placement of fills, trenching for power collection systems, and grading for roads and staging areas. The more extensive and deeper the earth-disturbing activity, the greater the potential for damage to paleontological resources.

Because they are sedimentary rocks, geologic units with potential to contain paleontological resources include most units in the program area. In particular, the Neroly Formation and some units of the Great Valley Sequence are known to contain vertebrate fossils. Substantial damage to or destruction of significant paleontological resources as defined by the Society of Vertebrate Paleontology (2010) would be a significant impact.

Because most geologic units in the program area are likely to be sensitive for paleontological resources, excavation in these units could damage paleontological resources.

This impact would be significant, but implementation of Mitigation Measures GEO-7a through GEO-7c would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-7a: Retain a qualified professional paleontologist to monitor significant ground-disturbing activities

The applicant will retain a qualified professional paleontologist as defined by the SVP's *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* (2010) to monitor activities with the potential to disturb sensitive paleontological resources. Data gathered during detailed project design will be used to determine the activities that will require the presence of a monitor. In general, these activities include any ground-disturbing activities involving excavation deeper than 3 feet in areas with high potential to contain sensitive paleontological resources. Recovered fossils will be prepared so that they can be properly documented. Recovered fossils will then be curated at a facility that will properly house and label them, maintain the association between the fossils and field data about the fossils' provenance, and make the information available to the scientific community.

Mitigation Measure GEO-7b: Educate construction personnel in recognizing fossil material

The applicant will ensure that all construction personnel receive training provided by a qualified professional paleontologist experienced in teaching non-specialists to ensure that they can recognize fossil materials in the event any are discovered during construction.

Mitigation Measure GEO-7c: Stop work if substantial fossil remains are encountered during construction

If substantial fossil remains (particularly vertebrate remains) are discovered during earth disturbing activities, activities within 100 feet of the find will stop immediately until a state-registered professional geologist or qualified professional paleontologist can assess the nature and importance of the find and a qualified professional paleontologist can recommend appropriate treatment. Treatment may include preparation and recovery of fossil materials so that they can be housed in an appropriate museum or university collection and may also include preparation of a report for publication describing the finds. The applicant will be responsible for ensuring that recommendations regarding treatment and reporting are implemented.

Impact GEO-7a-2: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature—program Alternative 2: 450 MW (less than significant with mitigation)

If fossils are present in the program area, they could be damaged by during earth-disturbing activities during construction activities, such as excavation for foundations, placement of fills, trenching for power collection systems, and grading for roads and staging areas. The more extensive and deeper the earth-disturbing activity, the greater the potential for damage to paleontological resources.

Because they are sedimentary rocks, geologic units with potential to contain paleontological resources include most units in the program area. In particular, the Neroly Formation and some units of the Great Valley Sequence are known to contain vertebrate fossils. Substantial damage to or destruction of significant paleontological resources as defined by the Society of Vertebrate Paleontology (2010) would be a significant impact.

Because most geologic units in the program area are likely to be sensitive for paleontological resources, excavation in these units could damage paleontological resources.

This impact would be significant, but implementation of Mitigation Measures GEO-7a through GEO-7c would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-7a: Retain a qualified professional paleontologist to monitor significant ground-disturbing activities

Mitigation Measure GEO-7b: Educate construction personnel in recognizing fossil material

Mitigation Measure GEO-7c: Stop work if substantial fossil remains are encountered during construction

Impact GEO-7b: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature—Golden Hills Project (less than significant with mitigation)

If fossils are present in the project area, they could be damaged by during earth-disturbing activities during construction activities, such as excavation for foundations, placement of fills, trenching for power collection systems, and grading for roads and staging areas. The more extensive and deeper the earth-disturbing activity, the greater the potential for damage to paleontological resources.

Because they are sedimentary rocks, geologic units with potential to contain paleontological resources include most units in the program area. In particular, the Neroly Formation and some units of the Great Valley Sequence are known to contain vertebrate fossils. Substantial damage to or destruction of significant paleontological resources as defined by the SVP (2010) would be a significant impact.

Because most geologic units in the project area are likely to be sensitive for paleontological resources, excavation in these units could damage paleontological resources.

This impact would be significant, but implementation of Mitigation Measures GEO-7a through GEO-7c would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-7a: Retain a qualified professional paleontologist to monitor significant ground-disturbing activities

Mitigation Measure GEO-7b: Educate construction personnel in recognizing fossil material

Mitigation Measure GEO-7c: Stop work if substantial fossil remains are encountered during construction

Impact GEO-7c: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature—Patterson Pass Project (less than significant with mitigation)

If fossils are present in the project area, they could be damaged by during earth-disturbing activities during construction activities, such as excavation for foundations, placement of fills, trenching for power collection systems, and grading for roads and staging areas. The more extensive and deeper the earth-disturbing activity, the greater the potential for damage to paleontological resources.

Because they are sedimentary rocks, geologic units with potential to contain paleontological resources include most units in the program area. In particular, the Neroly Formation and some units of the Great Valley Sequence are known to contain vertebrate fossils. Substantial damage to or destruction of significant paleontological resources as defined by the SVP (2010) would be a significant impact.

Because most geologic units in the project area are likely to be sensitive for paleontological resources, excavation in these units could damage paleontological resources.

This impact would be significant, but implementation of Mitigation Measures GEO-7a through GEO-7c would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-7a: Retain a qualified professional paleontologist to monitor significant ground-disturbing activities

Mitigation Measure GEO-7b: Educate construction personnel in recognizing fossil material

Mitigation Measure GEO-7c: Stop work if substantial fossil remains are encountered during construction

3.6.3 References Cited

Alameda County. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

Alameda County Community Development Agency. 2013. *Safety Element of the Alameda County General Plan*. Adopted January 8, 2013.

Bryant, W. A., and S. E. Cluett. 2002. *Fault Number 53b, Greenville Fault Zone, Marsh Creek-Greenville Section, in Quaternary Fault and Fold Database of the United States.* Last revised: July 23, 2012. Available: http://geohazards.usgs.gov/cfusion/qfault/qf_web_disp.cfm?qfault_or=1303&qfault_id=53b. Accessed: May 17, 2013.

Bryant, W., and E. Hart. 2007. Special Publication 42 Fault-Rupture Hazard Zones in California, Interim Revision. Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones1 Maps. California Geological Survey. August. Sacramento, CA. Available: ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sp/Sp42.pdf.

California Division of Mines and Geology. 1981. *Fault Evaluation Report FER 112.* Available: ftp://ftp.consrv.ca.gov/pub/dmg/pubs/fer/112/. Accessed: May 17, 2013.

———. 1982. *State of California Special Studies Zone, Altamont Official Map.* Effective January 1, 1982. Available: http://gmw.consrv.ca.gov/shmp/download/quad/ALTAMONT/maps/ALTAMONT.PDF. Accessed: May 17, 2013.

California Geological Survey. 2002. *California Geomorphic Provinces*. Note 36. Available: http://www.consrv.ca.gov/cgs/information/publications/cgs_notes/note_36/Documents/notn_36.pdf. Accessed: April 11, 2013.

———. 2003. *Seismic Shaking Hazards in California*. Last revised: April 13, 2011. Available: http://www.consrv.ca.gov/CGS/rghm/pshamap/pshamain.html. Accessed: April 2013.

———. 2007. Search for Regulatory Maps. Available: http://www.quake.ca.gov/gmaps/WH/regulatorymaps.htm. Accessed: April 8, 2013.

———. 2008. *Guidelines for Evaluating and Mitigating Seismic Hazards in California*. Special Publication 117A. Available: http://www.conservation.ca.gov/cgs/shzp/webdocs/Documents/sp117.pdf. Accessed: May 21, 2013.

———. 2009a. *California Seismic Hazard Zones, Altamont Quadrangle.* February 27. Available: http://gmw.consrv.ca.gov/shmp/download/quad/ALTAMONT/maps/ozn_alta.pdf. Accessed: May 16, 2013.

———. 2009b. *Seismic Hazard Zone Report for the Altamont 7.5-Minute Quadrangle, Alameda County, California.* Seismic Hazard Zone Report 119. Available: http://gmw.consrv.ca.gov/shmp/download/quad/ALTAMONT/reports/alta_eval.pdf. Accessed: May 16, 2013.

———. 2010. *2010 Fault Activity Map of California*. Geologic Data Map No. 6. Available: http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html. Accessed: May 2013.

Cao, T., W. A. Bryant, B. Rowshandel, D. Branum, and C. J. Wills. 2003. *The Revised 2002 California Probabilistic Seismic Hazard Maps*. June. Available: http://www.consrv.ca.gov/CGS/rghm/psha/fault_parameters/pdf/2002_CA_Hazard_Maps.pdf. Accessed: May 21, 2013.

Graymer, R. W., D. L. Jones, and E. E. Brabb. 1996. *Preliminary Geologic Map Emphasizing Bedrock Formations in Alameda County, California: A Digital Database.* Last revised: March 31, 2013. Available: http://ngmdb.usgs.gov/Prodesc/proddesc_22969.htm. Accessed: May 21, 2013.

International Code Council. 2011. *2012 International Building Code*. Albany, NY: Delmar Publishers.

Kohler-Antablin, S. 1996. *Update of Mineral Land Classification: Aggregate Materials in the South San Francisco Bay Production-Consumption Region.* California Division of Mines and Geology. DMG Open-File Report 96-03. Sacramento, CA.

Natural Resources Conservation Service. 2006. *Digital General Soil Map of U.S.* Last revised: July 6, 2006. Available: http://soildatamart.nrcs.usda.gov/Metadata.aspx?Survey=US. Accessed: May 20, 2013.

Norris, R. M., and R. W. Webb. 1990. *Geology of California*. 2nd edition. NY: John Wiley & Sons.

Paleo Portal. 2013. *The Paleontology Portal*, *Time & Space, California US.* Available: http://www.paleoportal.org/index.php. Accessed: June 27, 2013.

Society of Vertebrate Paleontology. 2010. *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources*. Available: http://www.vertpaleo.org/Impact_Mitigation_Guidelines.htm. Accessed: November 29, 2011.

University of California Museum of Paleontology. 2013a. *UCMP Advanced Specimen Search: Vertebrates and Neroly Formation.* Available: <http://ucmpdb.berkeley.edu/advanced.html>. Accessed: May 22, 2013.

———. 2013b. *UCMP Specimen Search: Alameda County.* Available: <http://ucmpdb.berkeley.edu/>. Accessed: May 22, 2013.

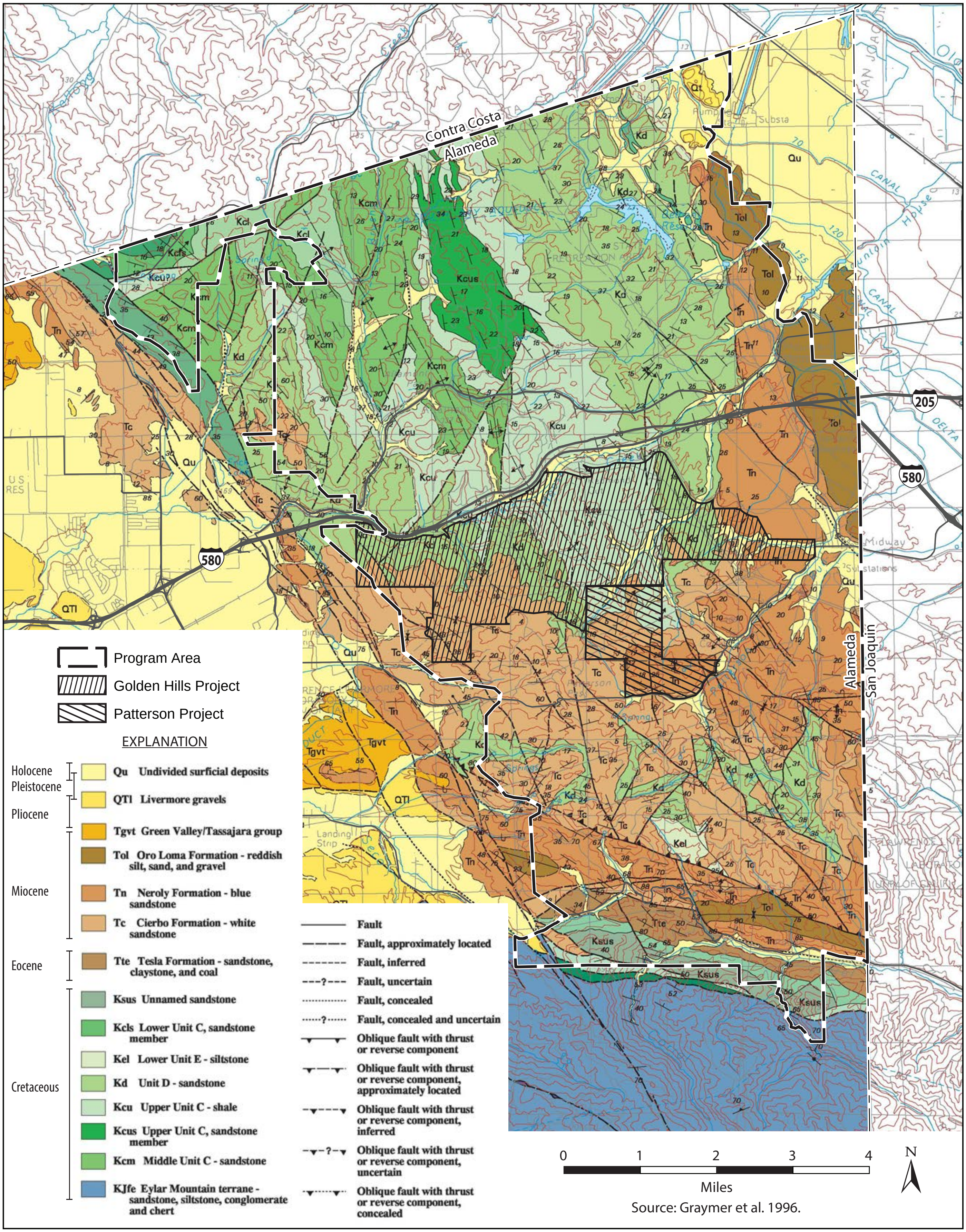
U.S. Geological Survey. 1999. *Maps Showing Locations of Damaging Landslides Caused by El Niño Rainstorms, Winter Season 1997-98, San Francisco Bay Region, California*. Pamphlet to accompany Miscellaneous Field Studies Maps MF-2325-A-J. Last revised: March 17, 2003. Available: <http://pubs.usgs.gov/mf/1999/mf-2325/>. Accessed: April 8, 2013.

———. 2013a. *EHP Quaternary Faults, Corral Hollow-Carnegie Fault Zone.* Last revised: April 17, 2013. Available: <http://geohazards.usgs.gov/qfaults/map.php>. Accessed: May 20, 2013.

———. 2013b. *EHP Quaternary Faults, Midway Fault.* Last revised: April 17, 2013. Available: <http://geohazards.usgs.gov/qfaults/map.php>. Accessed: May 20, 2013.

Unruh, J., and K. Krug. 2007. *Assessment and Documentation of Transpressional Structures, Northeastern Diablo Range, for the Quaternary Fault Map Database: Collaborative Research with William Lettis & Associates, Inc., and the U.S. Geological Survey.* Final Technical Report. Walnut Creek, CA. U. S. Geological Survey National Earthquake Hazards Reduction Program, Award 06HQGR0139. Available: http://earthquake.usgs.gov/research/external/reports/06HQGR0139.pdf.

Wagner, D. L., E. J. Bortugno, and R. D. McJunkin. 1991. *Geologic Map of the San Francisco–San Jose Quadrangle*. California Geological Survey, Regional Geologic Map No. 5A, 1:250,000 scale. Available: http://www.quake.ca.gov/gmaps/RGM/sfsj/sfsj.html. Accessed: April 8, 2013.



Graphics ... 00323.08 (2-21-2014)

Altamont Pass Wind Resource Area
Repowering Program

Figure 3.6-1
Geology Map

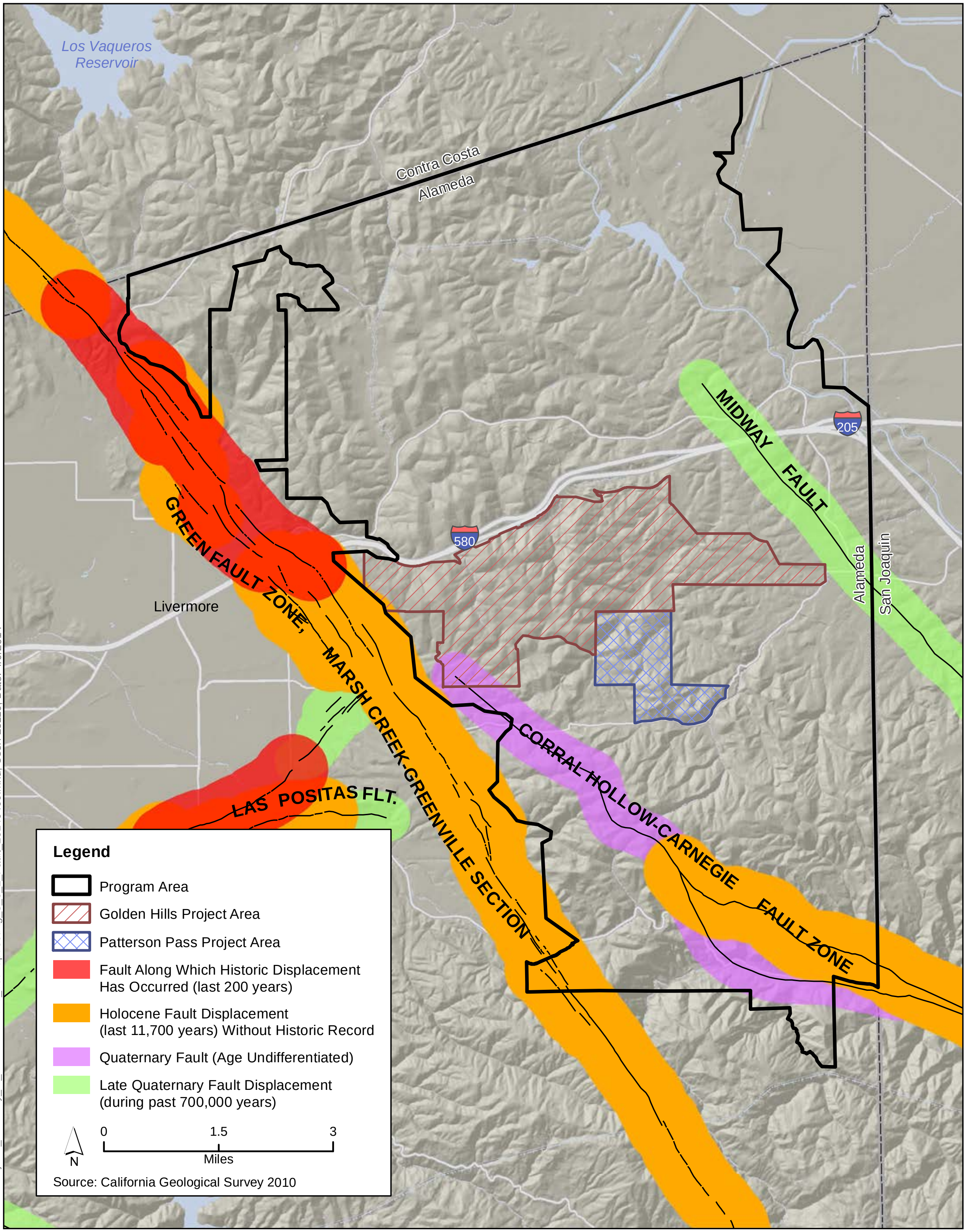
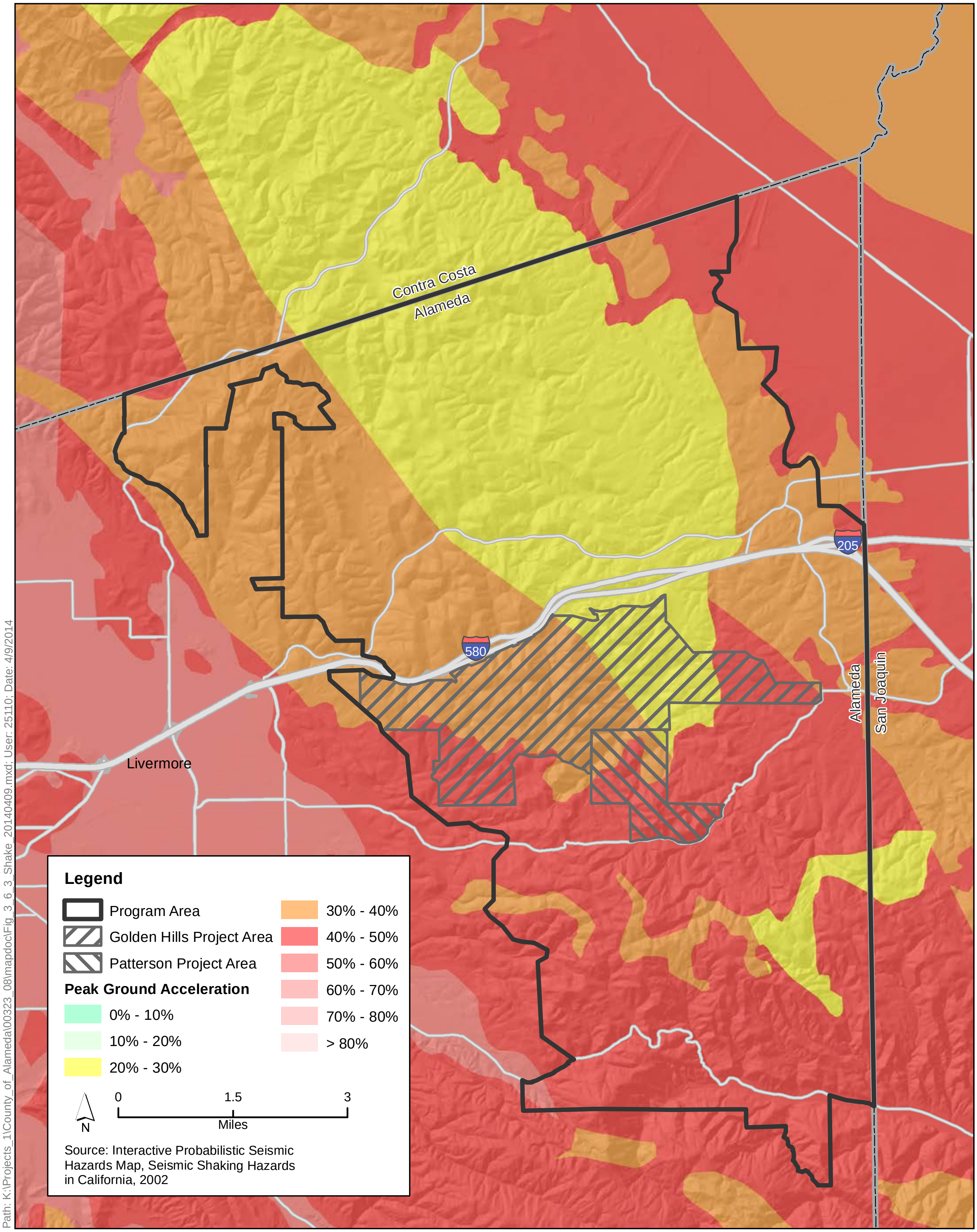
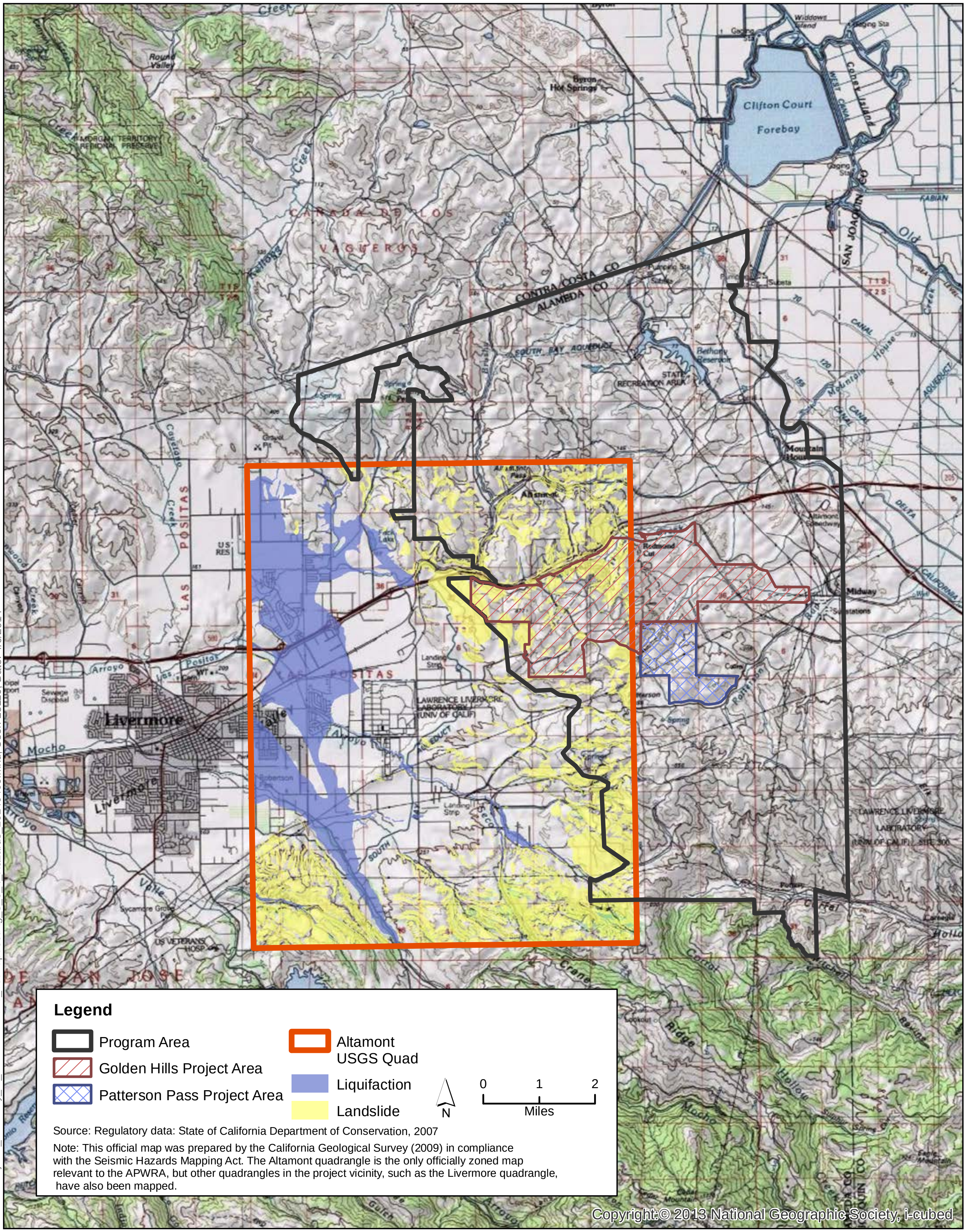


Figure 3.6-2
Fault Map



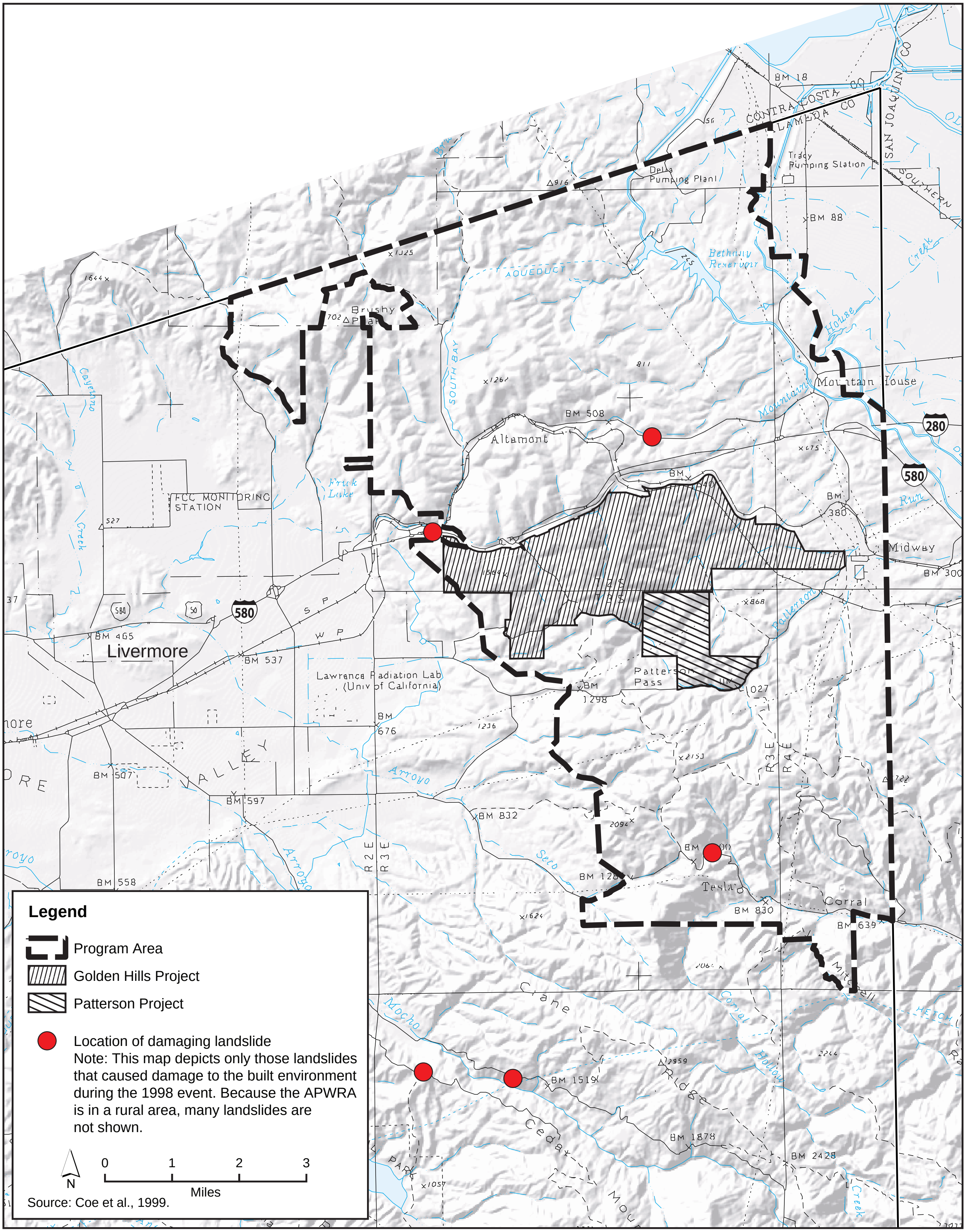
Altamont Pass Wind Resource Area
Repowering Program

Figure 3.6-3
Probabilistic Seismic Hazards Map (Seismic Shaking)



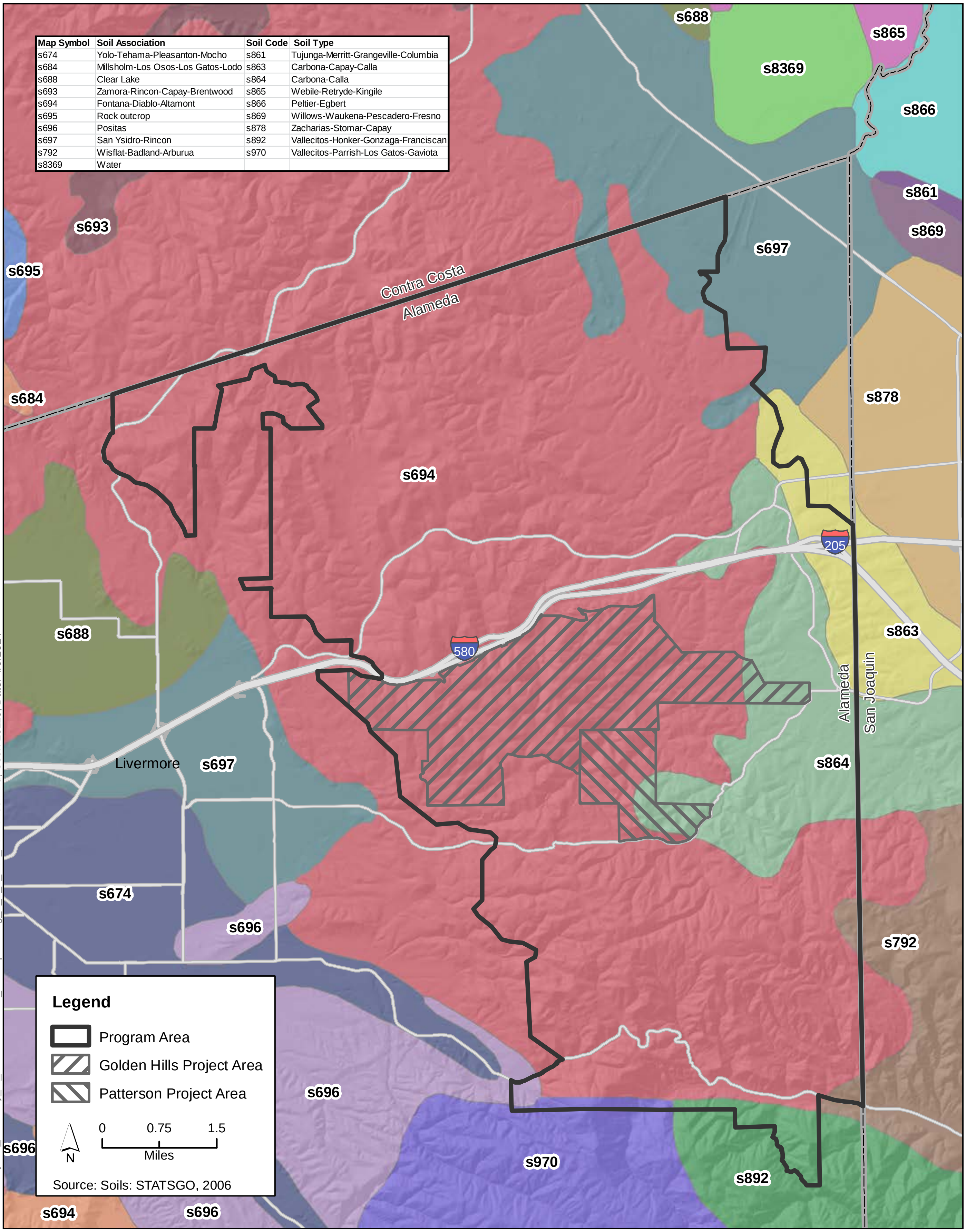
Altamont Pass Wind Resource Area
Repowering Program

Figure 3.6-4
Seismic Hazard Zone Map
for the Altamont 7.5-Minute Quadrangle



Altamont Pass Wind Resource Area
Repowering Program

Figure 3.6-5
Landslides Causing Damage to the Built Environment during Heavy Rain Event in 1998



Map Symbol	Soil Association	Soil Code	Soil Type
s674	Yolo-Tehama-Pleasanton-Mocho	s861	Tujunga-Merritt-Grangeville-Columbia
s684	Millsholm-Los Osos-Los Gatos-Lodo	s863	Carbona-Capay-Calla
s688	Clear Lake	s864	Carbona-Calla
s693	Zamora-Rincon-Capay-Brentwood	s865	Webile-Retryde-Kingile
s694	Fontana-Diablo-Altamont	s866	Peltier-Egbert
s695	Rock outcrop	s869	Willows-Waukena-Pescadero-Fresno
s696	Positas	s878	Zacharias-Stomar-Capay
s697	San Ysidro-Rincon	s892	Vallecitos-Honker-Gonzaga-Franciscan
s792	Wisflat-Badland-Arburua	s970	Vallecitos-Parrish-Los Gatos-Gaviota
s8369	Water		

Path: K:\Projects_1\County_of_Alameda\00323_08\mapdoc\Fig_3_6_6_Soil_20140409.mxd; User: 25110; Date: 4/9/2014

Altamont Pass Wind Resource Area
Repowering Program

Figure 3.6-6
Soil Associations Map

3.7 Greenhouse Gas Emissions

This section describes the regulatory and environmental setting concerning greenhouse gas emissions in the program and individual project areas. It also describes impacts on greenhouse gas (GHG) emissions that could result from implementation of the program and the two individual projects. Mitigation measures are prescribed where feasible and appropriate.

GHGs are considered separately from the air quality analysis in this PEIR, based on the consensus of climate scientists in California and elsewhere that although most GHGs are classed as air pollutants (see following descriptions of case law), the environmental consequences of GHGs for climate change considerations are substantially different and another order of magnitude as compared to criteria pollutants addressed in Chapter 3.3 *Air Quality*.

GHGs are deemed to contribute to climate change, including alterations in wind patterns, storms, precipitation, and temperature, based on historical records of temperature changes occurring in the past, such as during previous ice ages. This chapter describes first the regulatory setting applicable to the evaluation of the project and its generation of GHGs (almost exclusively during construction), then describes the environmental or physical nature of GHGs and climate change, before providing an analysis of the program and the subject projects and their effects regarding the generation of GHGs.

3.7.1 Existing Conditions

Regulatory Setting

This section summarizes federal, state, and local regulations related to GHG emissions and climate change that are applicable to the program and the Golden Hills and Patterson Pass Projects.

Federal

Massachusetts, et al. vs. U.S. Environmental Protection Agency (2007)

Twelve U.S. states and cities including California, in conjunction with several environmental organizations, sued to force EPA to regulate GHGs as a pollutant pursuant to the CAA in *Massachusetts, et al. v. Environmental Protection Agency* (549 US 497 [2007]). The court ruled that the plaintiffs had standing to sue, GHGs fit within the CAA's definition of a pollutant, and EPA's reasons for not regulating GHGs were insufficiently grounded in the CAA.

Mandatory Greenhouse Gas Reporting Rule (2009)

On September 22, 2009, EPA released its final Greenhouse Gas Reporting Rule (Reporting Rule). The Reporting Rule is a response to the fiscal year (FY) 2008 Consolidated Appropriations Act (H.R. 2764; Public Law 110-161), which required EPA to develop "mandatory reporting of greenhouse gasses above appropriate thresholds in all sectors of the economy…" The Reporting Rule would apply to most entities that emit 25,000 metric tons of CO_2e or more per year. Starting in 2010, facility owners are required to submit an annual GHG emissions report with detailed calculations of facility GHG emissions. The Reporting Rule also would mandate recordkeeping and administrative requirements in order for EPA to verify annual GHG emissions reports.

Environmental Protection Agency Endangerment and Cause and Contribute Findings (2009)

On December 7, 2009, EPA signed the Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the CAA. Under the Endangerment Finding, EPA finds that the current and projected concentrations of the six key well-mixed GHGs—carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), perfluorinated carbons (PFCs), sulfur hexafluoride (SF_6), and hydrofluorocarbons (HFCs)—in the atmosphere threaten the public health and welfare of current and future generations. Under the Cause or Contribute Finding, EPA finds that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

These findings do not themselves impose any requirements on industry or other entities. However, this action is a prerequisite to finalizing EPA's proposed new corporate average fuel economy standards for light-duty vehicles, which EPA proposed in a joint proposal including the Department of Transportation's proposed corporate average fuel-economy standards. EPA is still currently in its rule development process for the updated light-duty standards, and recently released responses to comments submitted during the comment period for the updated light-duty standards.

Council on Environmental Quality Draft NEPA Guidance (2010)

On February 19, 2010, the Council on Environmental Quality (CEQ) issued draft National Environmental Policy Act (NEPA) guidance on the consideration of the effects of climate change and GHG emissions. This guidance advises federal agencies that they should consider opportunities to reduce GHG emissions caused by federal actions, adapt their actions to climate change effects throughout the NEPA process, and address these issues in their agency NEPA procedures. Where applicable, the scope of the NEPA analysis should cover the GHG emissions effects of a proposed action and alternative actions, as well as the relationship of climate change effects on a proposed action or alternatives. The draft guidance suggests that the effects of projects directly emitting GHGs in excess of 25,000 tons annually be considered in a qualitative and quantitative manner. The CEQ does not propose this reference as a threshold for determining significance, but as "a minimum standard for reporting emissions under the CAA." The draft guidance also recommends that the cumulative effects of climate change on the proposed project be evaluated. The CEQ guidance is still considered draft as of the writing of this document and is not an official CEQ policy document (Council on Environmental Quality 2010).

Update to Corporate Average Fuel Economy Standards (2009)

The new Corporate Average Fuel Economy (CAFE) standards incorporate stricter fuel economy standards promulgated by the State of California into one uniform standard. Additionally, automakers are required to cut GHG emissions in new vehicles by roughly 25% by 2016. EPA, National Highway Traffic Safety Administration (NHTSA), and ARB have established GHG emissions standards for 2017 to 2025 model year passenger vehicles, which require an industry-wide average of 54.5 miles per gallon in 2025 (U.S. Environmental Protection Agency et al. 2011a). The official proposal was released by both EPA and NHTSA on December 1, 2011. The public comment period ended on February 13, 2012 (U.S. Environmental Protection Agency et al. 2011b). The rule was finalized by the NHTSA on August 28, 2012 (National Highway Traffic Safety Administration 2012).

United States Environmental Protection Agency Regulation of GHG Emissions under the Clean Air Act (2010–2012, ongoing)

Under the authority of the Clean Air Act, EPA is beginning to regulate GHG emissions starting with large stationary sources. In 2010, EPA set GHG thresholds to define when permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities. In 2012, EPA proposed a carbon pollution standard for new power plants.

State

Executive Order S-3-05 (2005)

Signed by Governor Arnold Schwarzenegger on June 1, 2005, Executive Order S-3-05 asserts that California is vulnerable to the effects of climate change. To combat this concern, Executive Order S-3-05 established the following GHG emissions reduction targets for state agencies.

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80% below 1990 levels.

Executive orders are binding only on state agencies. Accordingly, EO S-03-05 will guide state agencies' efforts to control and regulate GHG emissions but will have no direct binding effect on local government or private actions. The Secretary of CalEPA is required to report to the Governor and state legislature biannually on the impacts of global warming on California, mitigation and adaptation plans, and progress made toward reducing GHG emissions to meet the targets established in this executive order.

Senate Bills 1078/107/2 and Executive Order S-14-08—Renewable Portfolio Standard (2002, 2006, 2011)

Senate Bills (SB) 1078 and 107, California's Renewable Portfolio Standard (RPS), obligates investor-owned utilities (IOUs), energy service providers (ESPs), and Community Choice Aggregations (CCAs) to procure an additional 1% of retail sales per year from eligible renewable sources until 20% is reached, no later than 2010. The California Public Utilities Commission (CPUC) and California Energy Commission (CEC) are jointly responsible for implementing the program. EO S-14-08 set forth a longer-range target of procuring 33% of retail sales by 2020. SB 2 (2011) requires a Renewable Portfolio RPS of 33% by 2020.

Assembly Bill 1493—Pavley Rules (2002, Amendments 2009)

Known as "Pavley I," AB 1493 standards are the nation's first GHG standards for automobiles. AB 1493 requires ARB to adopt vehicle standards that will lower GHG emissions from new light duty autos to the maximum extent feasible beginning in 2009. Additional strengthening of the Pavley standards (referred to previously as "Pavley II," now referred to as the "Advanced Clean Cars" measure) has been proposed for vehicle model years 2017–2020. Together, the two standards are expected to increase average fuel economy to roughly 43 miles per gallon by 2020 and reduce GHG emissions from the transportation sector in California by approximately 14%. In June 2009, EPA granted California's waiver request enabling the state to enforce its GHG emissions standards for new motor vehicles beginning with the 2009 model year.

EPA and ARB have adopted a joint rulemaking to establish GHG emissions standards for 2017 to 2025 model-year passenger vehicles. The Interim Joint Technical Assessment Report for the standards evaluated four potential future standards ranging from 47 to 62 miles per gallon in 2025. The official proposal was released by both EPA and ARB on December 7, 2011, and was unanimously approved by ARB on January 26, 2012 (California Air Resources Board 2012a). The rule was finalized by the NHTSA on August 28, 2012 (National Highway Traffic Safety Administration 2012).

Assembly Bill 32—California Global Warming Solutions Act (2006)

AB 32 codified the State's GHG emissions target by requiring that the State's global warming emissions be reduced to 1990 levels by 2020. Since being adopted, ARB, CEC, the California Public Utilities Commission (CPUC), and the Building Standards Commission have been developing regulations that will help meet the goals of AB 32 and EO S-03-05. The Scoping Plan for AB 32 identifies specific measures to reduce GHG emissions to 1990 levels by 2020, and requires ARB and other State agencies to develop and enforce regulations and other initiatives for reducing GHGs. Specifically, the Scoping Plan articulates a key role for local governments, recommending they establish GHG reduction goals for both their municipal operations and the community consistent with those of the State (i.e., approximately 15% below current levels).

Executive Order S-01-07, Low Carbon Fuel Standard (2007)

EO S-01-07 mandates (1) that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10% by 2020, and (2) that a low-carbon fuel standard (LCFS) for transportation fuels be established in California. The EO initiates a research and regulatory process at ARB. Based on an implementation plan developed by CEC, ARB will be responsible for implementing the LCFS. On December 29, 2011, a federal judge issued a preliminary injunction blocking enforcement of the LCFS, ruling that the LCFS violates the interstate commerce clause (Georgetown Climate Center 2012). On April 13, 2012, a stay on the injunction was granted while the court considers ARB's appeal, allowing ARB to continue to implement and resume enforcement of LCFS (California Air Resources Board 2012b).

Senate Bill 375—Sustainable Communities Strategy (2008)

SB 375 provides for a new planning process that coordinates land use planning, regional transportation plans, and funding priorities in order to help California meet the GHG reduction goals established in AB 32. SB 375 requires regional transportation plans developed by metropolitan planning organizations (MPOs) to incorporate a "sustainable communities strategy" (SCS) in their Regional Transportation Plans (RTPs). The goal of the SCS is to reduce regional vehicle miles traveled (VMT) through land use planning and consequent transportation patterns. The regional targets were released by ARB in September 2010. SB 375 also includes provisions for streamlined CEQA review for some infill projects such as transit-oriented development. However, those provisions will not become effective until an SCS is adopted.

California Energy Efficiency Standards for Residential and Non-Residential buildings—Title 24 (2008)

The CEC periodically updates the energy efficiency requirements for residential and non-residential buildings. The currently applicable standards were adopted in 2008. The next standards were adopted in late May, 2012 and come into force in 2014.

California Green Building Standards Code—Title 24, Part 11 (2011)

On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (proposed Part 11, Title 24) was adopted as part of the California Building Standards Code (24 CCR). Part 11 establishes voluntary standards that became mandatory in the 2010 edition of the code, including planning and design for sustainable site development, water conservation, material conservation, and internal air contaminants. The standards took effect in January 1, 2011. The standards did not mandate improvements in energy efficiency above the Title 24 2008 standards.

Climate Change Scoping Plan (2008)

On December 11, 2008, pursuant to AB 32, ARB adopted the Climate Change Scoping Plan. This plan outlines how emissions reductions from significant sources of GHGs will be achieved through regulations, market mechanisms, and other actions. The Climate Change Scoping Plan also describes recommended measures that were developed to reduce GHG emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately affect low-income and minority communities. These measures put the state on a path to meet the long-term 2050 goal of reducing California's GHG emissions to 80% below 1990 levels.

State CEQA Guidelines (2010)

The State CEQA Guidelines require lead agencies to describe, calculate, or estimate the amount of GHG emissions that would result from a project. Moreover, the State CEQA Guidelines emphasize the need to determine potential climate change effects of the project and propose mitigation as necessary. The State CEQA Guidelines confirm the discretion of lead agencies to determine appropriate significance thresholds, but require the preparation of an EIR if "there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with adopted regulations or requirements" (§15064.4).

State CEQA Guidelines §15126.4 includes considerations for lead agencies related to feasible mitigation measures to reduce GHG emissions, which may include, among others, measures in an existing plan or mitigation program for the reduction of emissions that are required as part of the lead agency's decision; implementation of project features, project design, or other measures which are incorporated into the project to substantially reduce energy consumption or GHG emissions; offsite measures, including offsets that are not otherwise required, to mitigate a project's emissions; and measures that sequester carbon or carbon-equivalent emissions.

Greenhouse Gas Cap-and-Trade Program (2010/2011)

The development of a Cap-and-Trade program was included as a key reduction measure of ARB's AB 32 Climate Change Scoping Plan. The cap and trade emissions trading program developed by ARB took effect on January 1, 2012, with enforceable compliance obligations beginning January 1, 2013. The cap-and-trade program aims to regulate the greenhouse gas emissions from the largest producers in the state by setting a statewide firm limit, or cap, on the allowable annual GHGs. The cap contains three compliance phases. In compliance period one, large emitters from the electricity and industrial sector come under the cap. In the second period, which commences in 2015, fuels will be subject to the cap. Compliance phase three includes all three sectors (electricity, industry, fuels) and runs until 2020.

Each sector receives GHG trading allowances in a different way. Electricity receives allowances from ARB through a blend of auctions and free allocations based on emissions. Industry, by contrast, receives allowances based on their efficiency relative to other capped companies in their sector (benchmarks). The cap, or amount capped entities are able to emit, will decrease over time (approximately 2–3% each year). Capped entities with more allowances than emissions may bank some allowances to cover future emissions or sell those allowances back to the market established under the program. Capped entities with emissions that exceed their allowances must purchase more allowances in order to comply with the program.

ARB administered the first auction on November 14, 2012, with many of the qualified bidders representing corporations or organizations that produce large amounts of GHG emissions, including energy companies, agriculture and food industries, steel mills, cement companies, and universities (California Air Resources Board 2012c). It is anticipated that the program will cover around 350 to 400 businesses or *capped entities*, including those headquartered out of state if they operate facilities in California.

Local

Bay Area Air Quality Management District

The BAAQMD is the regional agency with jurisdiction over air quality in the nine-county region located in the Bay Area Air Basin. In June 2010, the BAAQMD adopted an update to its *CEQA Air Quality Guidelines* (BAAQMD Guidelines) (Bay Area Air Quality Management District 2010a), which includes specific significance thresholds for GHG emissions. The BAAQMD's June 2010 adopted thresholds of significance, which were subsequently updated in May 2011, were challenged in a lawsuit. The court found that the adoption of the thresholds was a project under CEQA and ordered the Air District to examine whether the thresholds would have a significant impact on the environment under CEQA before recommending their use. On August 13, 2013, the Court of Appeal of the State of California reversed the superior court's judgment, indicating that the 2011 thresholds do not represent a project under CEQA and could therefore go into effect without CEQA review (*California Building Industry Association v. Bay Area Air Quality Management District*). Consequently, this document uses the 2011 thresholds to determine significance (Bay Area Air Quality Management District 2011).

The County as lead agency has independently reviewed the BAAQMD's proposed thresholds and determined that they are supported on substantial evidence and are appropriate for use to determine significance in the environmental review of this project. Specifically, the County has determined that the BAAQMD thresholds are well-grounded on air quality regulations, scientific evidence, and scientific reasoning concerning air quality and GHG emissions. Using these thresholds for the program also allows a rigorous standardized approach to determining whether the program would cause a significant air quality impact. BAAQMD's Justification Report explains the agency's reasoning for adopting the thresholds (Bay Area Air Quality Management District 2009).

BAAQMD recommends that the following measures be incorporated into all projects.

- Use alternative-fueled (e.g., biodiesel, electric) construction vehicles/equipment for at least 15% of the fleet.
- Use at least 10% local building materials.
- Recycle or reuse at least 50% of construction waste or demolition materials.

Alameda County

In June 2011, the Alameda County Board of Supervisors approved a Final Draft Climate Action Plan (CCAP) for the unincorporated areas of Alameda County. The goal of this plan is to reduce Countywide GHG emissions by 15% by the year 2020. The Final Draft CCAP includes measures to reduce GHG emissions from the following activities.

- Transportation (e.g., bicycle infrastructure and transit service).
- Planning (e.g., encouraging high-density development and mixed-use development).
- Water conservation (e.g., water-efficient appliances and rainwater use).
- Waste diversion (e.g., improve services for recycling and composting).
- Building energy use (e.g., energy retrofits).
- Green infrastructure (e.g., urban forest expansion).

An environmental review was completed under CEQA for the CCAP to identify any significant impacts on the environment, and, how those impacts may be mitigated. The Negative Declaration and Initial Study prepared by County planning staff indicates that the General Plan Amendment and adoption of the CCAP would have no significant environmental impacts in any category of environmental issue reviewed. The CCAP, General Plan Amendment and Negative Declaration were adopted by the Board of Supervisors on February 4, 2014, and the CCAP is now in effect and part of the County General Plan.

Environmental Setting

Climate Change

The phenomenon known as the *greenhouse effect* keeps the atmosphere near the Earth's surface warm enough for the successful habitation of humans and other life forms. Present in the Earth's lower atmosphere, GHGs play a critical role in maintaining the Earth's temperature; GHGs trap some of the long-wave infrared radiation emitted from the Earth's surface that would otherwise escape to space. According to AB 32, California's Global Warming Solutions Act, GHGs encompass the following gases: CO_2, CH_4, N_2O, PFCs, SF_6, and HFCs. State CEQA Guidelines (Section 15364.5) also identify these six gases as GHGs. GHGs not defined by AB 32 include water vapor, ozone, and aerosols. Water vapor is an important component of our climate system and is not regulated. Ozone and aerosols are short-lived GHGs; global warming potentials for short-lived GHGs are not defined by the IPCC. Aerosols can remain suspended in the atmosphere for about a week and can warm the atmosphere by absorbing heat and cool the atmosphere by reflecting light. Black carbon is a type of aerosol that can also cause warming from deposition on snow.

Visible sunlight passes through the atmosphere without being absorbed. Some of the sunlight striking the Earth is absorbed and converted to heat, which warms the surface. The surface emits infrared radiation to the atmosphere, where some of it is absorbed by GHGs and re-emitted toward the surface; some of the heat is not trapped by GHGs and escapes into space. Human activities that emit additional GHGs to the atmosphere increase the amount of infrared radiation that gets absorbed before escaping into space, thus enhancing the greenhouse effect and amplifying the warming of the Earth (Center for Climate and Energy Solutions 2012).

Increases in fossil fuel combustion and deforestation have exponentially increased concentrations of GHGs in the atmosphere since the Industrial Revolution. Rising atmospheric concentrations of GHGs in excess of natural levels enhance the greenhouse effect, which contributes to global warming of the Earth's lower atmosphere and induces large-scale changes in ocean circulation patterns, precipitation patterns, global ice cover, biological distributions, and other changes to the earth system that are collectively referred to as climate change.

The Intergovernmental Panel on Climate Change (IPCC) has been established by the World Meteorological Organization and United Nations Environment Programme to assess scientific, technical, and socioeconomic information relevant to the understanding of climate change, its potential impacts, and options for adaptation and mitigation. The IPCC estimates that the average global temperature rise between the years 2000 and 2100 could range from 1.1° Celsius, with no increase in GHG emissions above year 2000 levels, to 6.4° Celsius, with substantial increase in GHG emissions (Intergovernmental Panel on Climate Change 2007a:97–115). Large increases in global temperatures could have substantial adverse effects on the natural and human environments on the planet and in California.

Principal Greenhouse Gases

The primary GHGs generated by the alternatives would be CO_2, CH_4, N_2O, and SF_6. Each of these gases is discussed in detail below. Note that PFCs and HFCs are not discussed as these gases are primarily generated by industrial processes, which are not anticipated as part of the project.

To simplify reporting and analysis, methods have been set forth to describe emissions of GHGs in terms of a single gas. The most commonly accepted method to compare GHG emissions is the global warming potential (GWP) methodology defined in the IPCC reference documents (Intergovernmental Panel on Climate Change 2007). The IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of CO_2 equivalent (CO_2e), which compares the gas in question to that of the same mass of CO_2 (CO_2 has a global warming potential of 1 by definition).

Table 3-7.1 lists the global warming potential of CO_2, CH_4, N_2O, and SF_6; their lifetimes; and abundances in the atmosphere.

Table 3.7-1. Lifetimes and Global Warming Potentials of Several Greenhouse Gases

Greenhouse Gases	Global Warming Potential (100 years)	Lifetime (years)	2005 Atmospheric Abundance
CO_2 [a]	1	50–200	379 ppm
CH_4	25	12	1,758–1,874 ppb
N_2O	298	114	323–324 ppb
HFC-23	14,800	270	18 ppt
HFC-134a	1,430	14	64 ppt
HFC-152a	124	1.4	3.9 ppt
SF_6 [a]	22,800	3,200	7.1–7.5 ppt

Sources: Intergovernmental Panel on Climate Change 2007b; Carbon Dioxide Information Analysis Center 2013; National Oceanic and Atmospheric Administration 2013.

CF = hydrofluorocarbons.
CH_4 = methane.
CO_2 = carbon dioxide.
N_2O = nitrous oxide.
ppm = parts per million by volume.
ppb = parts per billion by volume.
ppt = parts per trillion by volume.

Carbon Dioxide

CO_2 is the most important anthropogenic GHG and accounts for more than 75% of all GHG emissions caused by humans. Its atmospheric lifetime of 50–200 years ensures that atmospheric concentrations of CO_2 will remain elevated for decades even after mitigation efforts to reduce GHG concentrations are promulgated (Intergovernmental Panel on Climate Change 2007a). The primary sources of anthropogenic CO_2 in the atmosphere include the burning of fossil fuels (including motor vehicles), gas flaring, cement production, and land use changes (e.g., deforestation, oxidation of elemental carbon). CO_2 can be removed from the atmosphere by photosynthetic organisms.

Atmospheric CO_2 has increased from a pre-industrial concentration of 280 ppm to 379 ppm in 2005 (Intergovernmental Panel on Climate Change 2007b) and is currently at 397 ppm as of December 2013 (National Oceanic and Atmospheric Administration 2013).

Methane

CH_4, the main component of natural gas, is the second most abundant GHG and has a GWP of 25 (Intergovernmental Panel on Climate Change 2007b). Sources of anthropogenic emissions of CH_4 include growing rice, raising cattle, using natural gas, landfill outgassing, and mining coal (National Oceanic and Atmospheric Administration 2010). Certain land uses also function as a both a source and sink for CH_4. For example, wetlands are a terrestrial source of CH_4, whereas undisturbed, aerobic soils act as a CH_4 sink (i.e., they remove CH_4 from the atmosphere).

Atmospheric CH_4 has increased from a pre-industrial concentration of 715 ppb to up to 1,874 ppb in 2005 (National Oceanic & and Atmospheric Administration 2013). Recent measurements indicate that atmospheric CH_4 reached a concentration of nearly 1,800 ppb in 2010 (European Environmental Agency 2013a).

Nitrous Oxide

N_2O is a powerful GHG, with a GWP of 298 (Intergovernmental Panel on Climate Change 2007b). Anthropogenic sources of N_2O include agricultural processes (e.g., fertilizer application), nylon production, fuel-fired power plants, nitric acid production, and vehicle emissions. N_2O also is used in rocket engines, race cars, and as an aerosol spray propellant. Natural processes, such as nitrification and denitrification, can also produce N_2O, which can be released to the atmosphere by diffusion. In the U.S., more than 70% of N_2O emissions are related to agricultural soil management practices, particularly fertilizer application.

N_2O concentrations in the atmosphere have increased 18% from pre-industrial levels of 270 ppb to 319 ppb in 2005 (Intergovernmental Panel on Climate Change 2007b). Recent measurements indicate that atmospheric N_2O reached a concentration of nearly 324 ppb in 2010 (European Environmental Agency 2013b).

Sulfur Hexafluoride

SF_6, a human-made chemical, is used as an electrical insulating fluid for power distribution equipment, in the magnesium industry, in semiconductor manufacturing, and also as a tracer chemical for the study of oceanic and atmospheric processes (U.S. Environmental Protection Agency 2013a). In 2005, atmospheric concentrations of SF_6 were up to 7.5 parts per trillion (ppt) and steadily increasing in the atmosphere. SF_6 is the most powerful of all GHGs listed in IPCC studies, with a GWP of 22,800 (Intergovernmental Panel on Climate Change 2007b).

Greenhouse Gas Emissions Inventories

A GHG inventory is a quantification of all GHG emissions and sinks within a selected physical and/or economic boundary. GHG inventories can be performed on a large scale (i.e., for global and national entities) or on a small scale (i.e., for a particular building or person). Although many processes are difficult to evaluate, several agencies have developed tools to quantify emissions from certain sources.

Table 3-7.2 outlines the most recent global, national, statewide, and local GHG inventories to help contextualize the magnitude of potential project-related emissions.

Table 3.7-2. Global, National, State, and Local GHG Emissions Inventories

Emissions Inventory	CO_2e (metric tons)
2004 IPCC Global GHG Emissions Inventory	49,000,000,000
2011 EPA National GHG Emissions Inventory	6,708,300,000
2010 ARB State GHG Emissions Inventory	451,600,000
2010 SFBAAB GHG Emissions Inventory	95,800,000
2005 Unincorporated Alameda County GHG Emissions Inventory	930,000

Sources: Intergovernmental Panel on Climate Change 2007a; U.S. Environmental Protection Agency 2013b; California Air Resources Board 2013; Bay Area Air Quality Management District 2010b; Alameda County 2011.

CO_2e = carbon dioxide equivalent.

Impacts of Climate Change

Climate change is a complex phenomenon that has the potential to alter local climatic patterns and meteorology. Although modeling indicates that climate change will result globally and regionally in sea level rise, changes in climate and rainfall, and other effects, there remains uncertainty with regard to characterizing the precise *local* climate characteristics and predicting precisely how various ecological and social systems will react to any changes in the existing climate at the local level. Regardless of this uncertainty in precise predictions, it is widely understood that substantial climate change is expected to occur in the future, although the precise extent will take further research to define.

Consequently, the program area will be affected by changing climatic conditions. Research efforts coordinated through ARB, CEC, California Environmental Protection Agency (CalEPA), the University of California system, and others are examining the specific changes to California's climate that will occur as the Earth's surface warms. Climate change could affect the natural environment in California in the following ways, among others.

- Rising sea levels along the California coastline, particularly in San Francisco and the San Joaquin Delta due to ocean expansion.
- Extreme-heat conditions, such as heat waves and very high temperatures, that could last longer and become more frequent.
- An increase in heat-related human deaths, infectious diseases and a higher risk of respiratory problems caused by deteriorating air quality.
- Reduced snowpack and stream flow in the Sierra Nevada Mountains, affecting winter recreation and water supplies.
- Potential increase in the severity of winter storms, affecting peak stream flows and flooding.
- Changes in growing season conditions that could affect California agriculture, causing variations in crop quality and yield.
- Changes in distribution of plant and wildlife species due to changes in temperature, competition from colonizing species, changes in hydrologic cycles, changes in sea levels, and other climate-related effects.

3.7.2 Environmental Impacts

Methods for Analysis

This section describes the methods and assumptions used to determine the direct and indirect impacts of the program and two individual projects and identifies the thresholds used to conclude whether an impact would be significant.

Baseline

The baseline conditions reflect the operation wind energy projects in the program area as a whole, including operations and maintenance-related vehicle trips and maintenance activities. The baseline year for the analysis of impacts associated with GHG emissions is 2013, when there were 3,100 units in production with a nameplate capacity of 316.4 MW producing approximately 550,000 megawatt-hours per year (MWh/year) assuming a 20% capacity factor. This is the baseline used for evaluating indirect GHG emissions associated with program-generated electricity.

Emission Calculation Methods

GHG emissions were estimated for construction and operational activities at a programmatic level, with a finer level of analysis conducted for two specific repowering projects, Golden Hills and Patterson Pass. This analysis is restricted to GHGs identified by AB 32, which include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. The program and the two projects would generate a variety of GHGs during construction and operation, including several defined by AB 32 such as carbon dioxide, methane, and nitrous oxide.

The program and the two projects may also emit GHGs s that are not defined by AB 32. For example, the project may generate aerosols. Aerosols are short-lived particles, as they remain in the atmosphere for about 1 week. Black carbon is a component of aerosol. Studies have indicated that black carbon has a high global warming potential; however, IPCC states that it has a low level of scientific certainty (Intergovernmental Panel on Climate Change 2007b). Water vapor could be emitted from evaporated water used for landscaping, but this is not a significant impact because water vapor concentrations in the upper atmosphere are primarily due to climate feedbacks rather than emissions from project-related activities. In addition, no introduced landscaping or irrigation is associated with either the program or the two projects, except as may be required on a very temporary basis for certain site restoration activities. Construction and operation of repowering projects would emit NO_X and VOCs, which are ozone precursors. Ozone is a GHG; however, unlike the other GHGs, ozone in the troposphere is relatively short-lived and can be reduced in the troposphere on a daily basis. Stratospheric ozone can be reduced through reactions with other pollutants.

Certain GHGs defined by AB 32 would not be emitted by the project. Perfluorocarbons and sulfur hexafluoride are typically used in industrial applications, none of which would be used by the repower. Therefore, it is not anticipated that either the program or the two projects would emit perfluorocarbons or sulfur hexafluoride.

An upstream emission source (also known as life cycle emissions) refers to emissions that were generated during the manufacture of products to be used for construction of a project. Upstream emission sources for the project include, but are not limited to, emissions from the manufacture of cement, emissions from the manufacture of steel, and/or emissions from the transportation of building materials to the material wholesaler. The upstream emissions were not estimated because they are not within the control of the project applicant and to do so would be speculative. Additionally, the California Air Pollution Control Officers Association White Paper on CEQA and climate change supports this conclusion by stating, “The full life-cycle of GHG [greenhouse gas] emissions from construction activities is not accounted for . . . and the information needed to characterize [life-cycle emissions] would be speculative at the CEQA analysis level” (California Air Pollution Control Officers Association 2008). Therefore, pursuant to State CEQA Guidelines Sections 15144 and 15145, upstream/ life-cycle emissions are speculative and no further discussion is necessary.

Emissions were calculated for a typical 80 MW repowering project using project data from the *Vasco Winds Repowering Project Draft Environmental Impact Report* (Contra Costa County 2010) because more specific data for repowering activities would not be available until project-level design is complete. These emissions were then scaled to the program area and the two project areas based on the relevant nameplate capacities. The scaling factors are as follows: 5.21 for program Alternative 1:

417 MW (416.5 MW nameplate capacity ÷ 80 MW metric nameplate capacity); 5.63 for program Alternative 2: 450 MW (450 MW nameplate capacity ÷ 80 MW metric nameplate capacity); 1.11 for the Golden Hills project (88.4 MW nameplate capacity [program buildout] ÷ 80 MW metric nameplate capacity); and 0.25 for the Patterson Pass project (19.8 MW nameplate capacity ÷ 80 MW metric nameplate capacity).

Construction emissions were estimated for each phase of construction for the following sources: offroad equipment, onroad vehicles (including truck trips and worker commutes), concrete batch plant operations, water consumption, and electricity use. Calculation methods from the following sources were used to estimate emissions: the California Emissions Estimator Model (CalEEMod) (South Coast Air Quality Management District 2011), the ARB EMission FACtors (EMFAC) 2011 model (California Air Resources Board 2013c), the Portland Cement Association (Portland Cement Association 2013), the California Air Pollution Control Officers Association (CAPCOA) GHG mitigation measure guidance document (California Air Pollution Control Officers Association 2010), and the Climate Registry (CR) (Climate Registry 2013a, 2013b). Additional standard emission factors, conversion factors, and methods were used to estimate emissions per standard GHG protocol consistent with BAAQMD guidance.

Operational emissions were estimated for offroad equipment (maintenance/operation activities), onroad vehicles (including truck trips and worker commutes), water consumption, electricity use, and circuit breaker leakage of sulfur hexafluoride (SF_6). Calculation methods from the same sources as for construction emissions were used to estimate operational emissions.

There will be a reduction in emissions associated with offsetting grid electricity with wind-generated electricity. This occurs because wind-generated energy is a renewable resource with zero GHG emissions associated with its production, and this energy replaces traditionally fossil fuel-derived electricity from the grid. As noted above, the capacity factor for existing turbines was assumed to be 20%. The program is anticipated to increase wind turbine efficiency by 50%, so a 30% capacity factor was used for the program turbines.

Stationary source emissions from fuel combustion at the batch plants were not estimated because specific data on the types of equipment (generators, engines, etc.) that will be used at the batch plants was not available. The cement used at the concrete batch plant is associated with indirect GHG emissions from its manufacture. CO_2 emissions are emitted during the combustion process as well as the calcination process when limestone is heated.[1] As the concrete ages, it carbonates, absorbing much of these CO_2 emissions. The manufacture of cement produces approximately 400 pounds (lbs) of CO_2 per cubic yard of concrete (60% calcination and 40% combustion) (Portland Cement Association 2013). However, over the lifetime of a concrete structure (100 years), approximately 57% of the CO_2 emitted during calcination will be reabsorbed into the limestone of the structure; roughly 7% of calcination emissions are absorbed during carbonation and 50% of calcination emissions will be absorbed once the structure is demolished and returned to fine particles (typically through recycling). To account for the partial reabsorption of CO_2 during the life of the structure, construction emissions generated by calcination (240 lbs CO_2/cy) were multiplied by 7% and included as an emissions sink under operational activities (16.8 lbs CO_2/cy).

[1] These emissions will occur at cement manufacturing facilities located outside of the program area, but are included in this analysis to provide as complete a picture as possible of indirect emissions associated with the Repowering Program.

Indirect GHG emissions from electricity used during construction and operation and for water delivery to the site were also estimated. The Pacific Gas & Electric (PG&E) emission factor for electricity deliveries for the year 2011 was used (392.9 lbs/MWh) to estimate emissions from electricity use (Climate Registry 2013b). To determine the amount of electricity needed to convey water to the project site, the CAPCOA energy intensity factor of 4,533 kWh/million gallons was used for conveyance of water from the State Water Project (California Air Pollution Control Officers Association 2010).

Important assumptions (associated with the 80 MW project Vasco example) used in the analysis are presented below (the same assumptions presented in Section 3.3, *Air Quality*, were used in this analysis).

- 10,500,000 gallons of water are required. This includes 500,000 gallons for concrete and incidental uses and 10,000,000 gallons for dust control.
- 4,500 kWh of electricity are consumed for construction
- 4,500 kWh of electricity are consumed annually for operational activities.
- 3,500 cubic yards of concrete are required.
- The CO_2 emission factors from EMFAC 2011 used for onroad vehicles do not include the influence of Pavley or the Low Carbon Fuel Standard (to present a conservative estimate of GHG emissions).

Determination of Significance

In accordance with Appendix G of the State CEQA Guidelines, program Alternative 1, program Alternative 2, the Golden Hills project, or the Patterson Pass project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

As mentioned above, the BAAQMD recently adopted an approach for assessing GHG-related impacts in CEQA review documents. The BAAQMD's 2010/2011 *CEQA Air Quality Guidelines* identify qualitative and quantitative operation-related thresholds of significance that can be applied to the significance criteria listed above. Note that climate change is a global problem, and GHGs are global pollutants, unlike criteria air pollutants (such as ozone precursors, which are primarily pollutants of regional and local concern). Given their long atmospheric lifetimes (see Table 3.7-1), GHGs emitted by countless sources worldwide accumulate in the atmosphere. No single emitter of GHGs is large enough to trigger global climate change on its own. Rather, climate change is the result of the individual contributions of countless past, present, and future sources. Therefore, GHG impacts are inherently cumulative. Consequently, the BAAQMD, as well as other jurisdictions and agencies, consider climate change to be a cumulative issue. Specifically, the BAAQMD indicates in their CEQA Guidelines:

> "If annual emissions of operational-related GHGs exceed these threshold levels, the proposed project would result in a cumulatively considerable contribution of GHG emissions and a

cumulatively significant impact to global climate change (Bay Area Air Quality Management District 2011)."

Consequently, the evaluation of climate change impacts in this analysis represents a cumulative analysis. Because the Court of Appeal of the State of California reversed the superior court's judgment challenging the 2010/2011 thresholds, the 2010/2011 thresholds are used to determine significance for construction and operational activities (Bay Area Air Quality Management District 2011).

According to the 2011 BAAQMD Guidelines, separate GHG thresholds are established for operational emissions from stationary sources and non-stationary sources. The stationary source threshold is 10,000 metric tons per year. For non-stationary sources, three separate thresholds are established.

- Compliance with Qualified GHG Reduction Strategy (i.e., if a project is found to be out of compliance with a Qualified GHG Reduction Strategy, its GHG emissions may be considered significant); or
- 1,100 metric tons of CO_2e per year; or
- 4.6 metric tons CO_2e per service population per year (service population is the sum of residents plus employees expected for a development project).

With the exception of minor GHG emissions that would be associated with substations, the program would primarily consist of non-stationary sources, such as those that would be generated during construction activities by trucks, grading equipment and cranes. For projects other than stationary sources, the proposed threshold is noncompliance with a qualified climate action plan or if it would result in annual operational emissions of more than 1,100 metric tons CO_2e per year. This threshold is more conservative than that for stationary sources (i.e., 10,000 metric tons CO_2e per year). Therefore, for the purposes of this analysis, project-related direct and indirect GHG emissions would be considered to result in a significant cumulative impact on the environment if the emissions would be more than 1,100 metric tons CO_2e per year.

The BAAQMD Guidelines do not identify an approach to assessing the significance of construction-related GHG emissions. However, the South Coast Air Quality Management District (SCAQMD) has adopted an approach for assessing construction emissions that includes amortizing construction emissions over the life span of the project, defined as 30 years, then adding those emissions to the operational emissions, and then comparing the combined emissions to the applicable GHG significance threshold (South Coast Air Quality Management District 2008). Therefore, in the absence of a BAAQMD-recommended approach for assessing construction GHG emissions, this analysis adopts the SCAQMD's recommended approach of amortizing construction emissions over a 30 year period and comparing combined construction and operational emissions to the applicable GHG significance threshold, which in this case is the BAAQMD non-stationary source threshold of 1,100 metric tons CO_2e per year.

Alameda County has recently adopted a qualified climate action plan for unincorporated Alameda County that would be applicable to the program. Based on the CCAP approved by the County Board of Supervisors, the program's and projects' potential to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emission of GHG is also assessed by examining any conflicts with the CCAP. It is also assessed by examining any conflicts with the GHG reduction goals set forth in AB 32, including the potential for the project to conflict with the 39 Recommended

Actions identified by ARB in its Climate Change Scoping Plan, which includes nine Early Action Measures.

Impacts and Mitigation Measures

Impact GHG-1a-1: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment—program Alternative 1: 417 MW (less than significant)

Construction of the program would occur over a period of 9 months per year for approximately 4 years. It is estimated that there would be approximately 184 workdays per year that would include the use of heavy construction equipment. Construction activities at the project sites would be associated with decommissioning and foundation removal of existing turbine sites; laydown yards substations and switch yards; road construction; turbine foundations and batch plant operation; turbine delivery and installation; utility collector line installation; and restoration and clean up. Each of these activities would occur over periods that would range from approximately 2 to 4 months. It is estimated that as many as 90 pieces of offroad construction equipment, including cranes, excavators, graders, loaders, cement trucks, and bulldozers, would be required for an average of 8 hours per day to construct the program. At any given time, approximately 6 to 54 pieces of construction equipment would be operating, depending on the construction phasing.

In addition to the offroad equipment, onroad vehicle trips would be required to deliver materials and equipment to the construction sites and to transport workers to and from the construction sites. It is anticipated that an average of approximately 140 truck trips and 86 commuting worker trips would be required per day during the 9-month construction period for each year. It is anticipated that the majority of equipment- and material-related truck trips would originate at the Port of Stockton and in the City of Tracy and that the construction worker-related commute trips would occur entirely within the Bay Area. The portion of the equipment, material, and aggregate haul trips that would originate at the Port of Stockton and in the City of Tracy would be generated in the San Joaquin Valley, which is under the jurisdiction of the SJVAPCD. However, the SJVAPCD does not have thresholds for GHG emissions. Therefore, the heavy-duty truck trip exhaust emissions that would be generated in the San Joaquin Valley have been added to the Bay Area GHG emissions and compared to BAAQMD annual significance thresholds.

Total GHG emissions associated with construction of the program have been estimated and are presented in Table 3.7-3. As discussed above, construction GHG exhaust emissions were estimated using CalEEMod (South Coast Air Quality Management District 2011) and the EMFAC 2011 model (California Air Resources Board 2013c). In addition, indirect GHG emissions associated with water use for dust control were estimated for the program by employing emission factors and assumptions from the CAPCOA GHG mitigation measure guidance document (California Air Pollution Control Officers Association 2010), and the Climate Registry (CR) (Climate Registry 2013a, 2013b).

Operational GHG emissions above baseline would consist of SF_6 leakage. The proposed new circuit breaker would require the use of SF_6, which could leak during operation. It was assumed that the new circuit breaker would have a capacity of approximately 210 pounds of SF_6 (Contra Costa County 2010). EPA estimates that leaking circuit breakers manufactured in 1999 and later emit less than 1% of the SF_6 nameplate capacity (U.S. Environmental Protection Agency 2006). Considering this information, the program could emit up to approximately 2.6 pounds of SF_6 per year, which is equal to approximately 28.5 metric tons CO_2e per year. In addition, when the wind turbine generators are not operating, the program could draw energy from the electricity grid to maintain security lighting, O&M building power, and communications equipment. Although this maintenance load would be substantially the same as for the existing wind energy facility, emissions from this electricity use during operations were calculated. Operational emissions are summarized in Table 3.7-3.

With respect to emissions from maintenance activities, the baseline includes maintenance activities, including maintenance vehicle trips, at the existing wind energy facility. Daily emissions associated with maintenance of the program would be similar, and thus the potential increase or decrease in maintenance-related emissions would be negligible. However, operational emissions from offsite worker trips, maintenance activities, and electricity use were estimated. Emission sinks from partial reabsorption of CO_2 during the life of the concrete structures were also included as an emissions sink for operational activities (Portland Cement Association 2013). These emissions are presented in Table 3.7-3.

Table 3.7-3. Program Construction and Operation GHG Emissions for the Bay Area

	Estimated Total Emissions (metric tons)				
Construction Activity	CO_2	CH_4	N_2O	SF_6	CO_2e
Construction Activity (all years)					
Decommissioning and foundation removal	1,810.79	0.11	0.05	0.00	1,827.88
Laydown yards substations and switch yards	1,174.69	0.07	0.03	0.00	1,186.13
Road construction	1,682.78	0.11	0.04	0.00	1,698.93
Turbine foundations and batch plant [a]	7,479.47	0.26	0.11	0.00	7,519.67
Turbine delivery and installation	1,153.94	0.07	0.03	0.00	1,164.92
Utility collector line installation	808.92	0.03	0.02	0.00	816.21
Restoration and clean up	589.02	0.04	0.01	0.00	594.49
Offsite truck trips	13,114.73	0.16	0.65	0.00	13,320.78
Offsite worker trips	884.67	0.01	0.02	0.00	892.55
Electricity use	4.17	0.00	0.00	0.00	4.20
Water use—indirect emissions	44.16	0.00	0.00	0.00	44.44
Total	28,747.34	0.88	0.98	0.00	29,070.21
Amortized (per year for 30 years)					969.01
Operational Activity (per year)					
Offsite worker trips	28.24	0.00	0.00	0.00	28.47
Maintenance/operation	78.91	0.01	0.00	0.00	79.70
Electricity use	1.00	0.00	0.00	0.00	1.01
Circuit breaker leakage	0.00	0.00	0.00	0.00	28.46
Concrete carbonation	-1.11	0.00	0.00	0.00	-1.11
Total	107.05	0.01	0.00	0.00	136.52

Construction Activity	Estimated Total Emissions (metric tons) CO_2	CH_4	N_2O	SF_6	CO_2e
Total construction and operation emissions (per year)					1,105.52
Annual GHG reductions from offsetting grid electricity					-96,897.62
Annual net GHG emissions					-95,792.09
BAAQMD significance threshold					1,100
Significant impact?					No

[a] Includes direct emissions from construction activities for the construction phase along with indirect stationary CO_2 emissions associated with the manufacture of the concrete (offsite) used at the batch plants (onsite). Indirect emissions include fuel combustion emissions and calcination emissions.

As shown in Table 3.7-3, total GHG construction emissions in the form of CO_2e would be approximately 29,070 metric tons. These emissions amortized over a 30-year period equal approximately 969 metric tons per year. Adding to that the operation emissions of 137 metric tons CO_2e per year, total program GHG emissions would be approximately 1,106 metric tons CO_2e per year, which would be greater than the BAAQMD's significance threshold of 1,100 metric tons CO_2e per year for non-stationary sources. However, it should be noted that total program GHG emissions would be immaterial compared to the GHG emissions that would be avoided by the increased wind energy it will produce. By replacing older model turbines with new, more efficient ones, the program would reduce energy production-related contributions to climate change overall, relative to the existing facility, because it would contribute an additional 100 MW of nameplate capacity with turbines that are 50% more efficient than the existing turbines. The program would contribute approximately 540,000 MWh of additional wind-generated energy per year to the power grid compared to baseline conditions,[2] and would therefore replace the same amount of conventional (carbon-based) energy production. Using an emission factor of 329.9 pounds of CO_2e per MWh developed by PG&E for its current energy production portfolio (Climate Registry 2013b), it can be estimated that the program would result in an annual GHG emissions reduction of 96,898 metric tons CO_2e. Therefore, operation of the program would result in a net reduction of approximately 95,792 metric tons CO_2e per year and there would be no long-term impacts associated with GHG emissions generated by the program.

This impact would be less than significant.

Impact GHG-1a-2: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment—program Alternative 2: 450 MW (less than significant)

Construction of program Alternative 2 would occur over a period of approximately 4 years. It is estimated that there would be approximately 184 workdays per year that would involve the use of heavy construction equipment. Construction activities would entail the same phases, construction equipment, and truck trips as listed above for the year-by-year implementation of the program.

Total GHG emissions associated with construction of Alternative 2 have been estimated and are presented in Table 3.7-4. As discussed above, construction GHG exhaust emissions were estimated using CalEEMod (South Coast Air Quality Management District 2011) and the ARB EMFAC 2011

[2] Calculation: 316.4 MW * 20% capacity * 8,760 hours per year = 554,280 MWh (baseline); 416.4 MW * 30% capacity * 8,760 hours per year = 1,094,562 MWh (Repowering Program). Difference = 540,282 MWh.

model (California Air Resources Board 2013c). In addition, indirect GHG emissions associated with water use for dust control were estimated for the project by employing emission factors and assumptions from the CAPCOA GHG mitigation measure guidance document (California Air Pollution Control Officers Association 2010), and the Climate Registry (CR) (Climate Registry 2013a, 2013b).

Operational GHG emissions above baseline would consist of SF_6 leakage; these emissions were quantified using the same methods as discussed for the program. Similar to the program, daily emissions associated with maintenance of the Golden Hills Project would be similar to baseline conditions, and thus the potential increase or decrease in maintenance-related emissions would be negligible. However, operational emissions from offsite worker trips, maintenance activities, and electricity use were estimated. Emission sinks from partial reabsorption of CO_2 during the life of the concrete structures were also included as an emissions sink for operational activities (Portland Cement Association 2013). These emissions are presented in Table 3.7-4.

Table 3.7-4. Program Alternative 2: Construction and Operation GHG Emissions for the Bay Area

	Estimated Total Emissions (metric tons)				
Construction Activity	CO_2	CH_4	N_2O	SF_6	CO_2e
Construction Activity (all years)					
Decommissioning and foundation removal	1,956.44	0.12	0.05	0.00	1,974.90
Laydown yards substations and switch yards	1,269.17	0.08	0.03	0.00	1,281.54
Road construction	1,818.13	0.12	0.05	0.00	1,835.58
Turbine foundations and batch plant [a]	8,081.06	0.28	0.12	0.00	8,124.49
Turbine delivery and installation	1,246.75	0.08	0.03	0.00	1,258.62
Utility collector line installation	873.98	0.04	0.02	0.00	881.86
Restoration and clean up	636.40	0.04	0.02	0.00	642.30
Offsite truck trips	14,169.57	0.18	0.71	0.00	14,392.20
Offsite worker trips	955.82	0.01	0.03	0.00	964.34
Electricity use	4.51	0.00	0.00	0.00	4.54
Water use—indirect emissions	47.71	0.00	0.00	0.00	48.02
Total	31,059.55	0.95	1.06	0.00	31,408.40
Amortized (per year for 30 years)					1,046.95
Operational Activity (per year)					
Offsite worker trips	28.24	0.00	0.00	0.00	28.47
Maintenance/operation	78.91	0.01	0.00	0.00	79.70
Electricity use	1.00	0.00	0.00	0.00	1.01
Circuit breaker leakage	0.00	0.00	0.00	0.00	28.46
Concrete carbonation	-1.11	0.00	0.00	0.00	-1.11
Total	107.05	0.01	0.00	0.00	136.52

Construction Activity	Estimated Total Emissions (metric tons)				
	CO_2	CH_4	N_2O	SF_6	CO_2e
Total construction and operation emissions (per year)					1,183.46
Annual GHG reductions from offsetting grid electricity					-112,686.92
Annual net GHG emissions					-111,503.46
BAAQMD significance threshold					1,100
Significant impact?					No

[a] Includes direct emissions from construction activities for the construction phase along with indirect stationary CO_2 emissions associated with the manufacture of the concrete (offsite) used at the batch plants (onsite). Indirect emissions include fuel combustion emissions and calcination emissions.

As shown in Table 3.7-4, total GHG construction emissions in the form of CO_2e would be approximately 31,408 metric tons. These emissions amortized over a 30-year period equal approximately 1,047 metric tons per year. Adding to that the operation emissions of 137 metric tons CO_2e per year, total program Alternative 2 GHG emissions would be approximately 1,183 metric tons CO_2e per year, which would be greater than the BAAQMD's significance threshold of 1,100 metric tons CO_2e per year for non-stationary sources. As described above, it should be noted that total program Alternative 2 GHG emissions would be immaterial compared to the GHG emissions that would be avoided by the increased production of wind energy under the Golden Hills Project. By replacing older model turbines with new, more efficient ones, program Alternative 2 would reduce energy production-related contributions to climate change overall, relative to the existing facility, because it would contribute approximately 150% more power to the grid by installing turbines that are 50% more efficient than the existing turbines. The project would contribute approximately 628,000 MWh of additional wind-generated energy per year to the power grid compared to baseline conditions,[3] and would therefore replace the same amount of conventional (carbon-based) energy production. Using an emission factor of 329.9 pounds of CO_2e per MWh developed by PG&E for its current energy production portfolio (Climate Registry 2013b), it can be estimated that program Alternative 2 would result in an annual GHG emissions reduction of 112,687 metric tons CO_2e. Therefore, operation of program Alternative 2 would result in a net reduction of approximately 111,503 metric tons CO_2e per year and there would be no long-term impacts associated with project-generated GHG emissions.

This impact would be less than significant.

Impact GHG-1b: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment—Golden Hills Project (less than significant)

Construction of the Golden Hills Project would occur over a period of approximately 9 months. It is estimated that there would be approximately 184 workdays that would involve the use of heavy construction equipment. Construction activities would entail the same phases, construction equipment, and truck trips as listed above for the year-by-year implementation of the program, even though the overall construction activities at Golden Hills are much less than the program as a whole.

Total GHG emissions associated with construction of the Golden Hills Project have been estimated and are presented in Table 3.7-5. As discussed above, construction GHG exhaust emissions were

[3] Calculation: 316.4 MW * 20% capacity * 8,760 hours per year = 554,280 MWh (baseline); 450 MW * 30% capacity * 8,760 hours per year = 1,182,600 MWh (Repowering Program). Difference = 628,320 MWh.

estimated using CalEEMod (South Coast Air Quality Management District 2011) and the ARB EMFAC 2011 model (California Air Resources Board 2013c). In addition, indirect GHG emissions associated with water use for dust control were estimated for the project by employing emission factors and assumptions from the CAPCOA GHG mitigation measure guidance document (California Air Pollution Control Officers Association 2010), and the Climate Registry (CR) (Climate Registry 2013a, 2013b).

Operational GHG emissions above baseline would consist of SF_6 leakage; these emissions were quantified using the same methods as discussed for the program. Similar to the program, daily emissions associated with maintenance of the Golden Hills Project would be similar to baseline conditions, and thus the potential increase or decrease in maintenance-related emissions would be negligible. However, operational emissions from offsite worker trips, maintenance activities, and electricity use were estimated. Emission sinks from partial reabsorption of CO_2 during the life of the concrete structures were also included as an emissions sink for operational activities (Portland Cement Association 2013). These emissions are presented in Table 3.7-5.

Table 3.7-5. Golden Hills Project Construction and Operation GHG Emissions for the Bay Area

	Estimated Total Emissions (metric tons)				
Construction Activity	CO_2	CH_4	N_2O	SF_6	CO_2e
Construction Activity (all years)					
Decommissioning and foundation removal	384.33	0.02	0.01	0.00	387.96
Laydown yards substations and switch yards	249.32	0.02	0.01	0.00	251.75
Road construction	357.16	0.02	0.01	0.00	360.59
Turbine foundations and batch plant [a]	1,587.48	0.06	0.02	0.00	1,596.01
Turbine delivery and installation	244.92	0.01	0.01	0.00	247.25
Utility collector line installation	171.69	0.01	0.00	0.00	173.24
Restoration and clean up	125.02	0.01	0.00	0.00	126.18
Offsite truck trips	2,783.53	0.03	0.14	0.00	2,827.27
Offsite worker trips	187.77	0.00	0.01	0.00	189.44
Electricity use	0.89	0.00	0.00	0.00	0.89
Water use—indirect emissions	9.37	0.00	0.00	0.00	9.43
Total	6,101.48	0.19	0.21	0.00	6,170.00
Amortized (per year for 30 years)					205.67
Operational Activity (per year)					
Offsite worker trips	24.97	0.00	0.00	0.00	25.16
Maintenance/operation	69.76	0.01	0.00	0.00	70.45
Electricity use	0.89	0.00	0.00	0.00	0.89
Circuit breaker leakage	0.00	0.00	0.00	0.00	25.16
Concrete carbonation	-0.98	0.00	0.00	0.00	-0.98
Total	94.63	0.01	0.00	0.00	120.68
Total construction and operation emissions (per year)					326.35
Annual GHG reductions from offsetting grid electricity					-13,888.30
Annual net GHG emissions					-13,561.95

	Estimated Total Emissions (metric tons)				
Construction Activity	CO_2	CH_4	N_2O	SF_6	CO_2e
BAAQMD significance threshold					1,100
Significant impact?					No

[a] Includes direct emissions from construction activities for the construction phase along with indirect stationary CO_2 emissions associated with the manufacture of the concrete (offsite) used at the batch plants (onsite). Indirect emissions include fuel combustion emissions and calcination emissions.

As shown in Table 3.7-5, total GHG construction emissions in the form of CO_2e would be approximately 5,688 metric tons. These emissions amortized over a 30-year period equal approximately 190 metric tons per year. Adding to that the operation emissions of 111 metric tons CO_2e per year, total Golden Hills Project GHG emissions would be approximately 301 metric tons CO_2e per year, which would be less than the BAAQMD's significance threshold of 1,100 metric tons CO_2e per year for non-stationary sources.

It also should be noted that total Golden Hills GHG emissions would be immaterial compared to the GHG emissions that would be avoided by the increased production of wind energy under the Golden Hills Project. By replacing older model turbines with new, more efficient ones, the Golden Hills Project would reduce energy production-related contributions to climate change overall, relative to the existing facility, because it would contribute approximately 150% more power to the grid by installing turbines that are 50% more efficient than the existing turbines. The project would contribute approximately 71,000 MWh of additional wind-generated energy per year to the power grid compared to baseline conditions,[4] and would therefore replace the same amount of conventional (carbon-based) energy production. Using an emission factor of 329.9 pounds of CO_2e per MWh developed by PG&E for its current energy production portfolio (Climate Registry 2013b), it can be estimated that the Golden Hills Project would result in an annual GHG emissions reduction of 12,804 metric tons CO_2e. Therefore, operation of the Golden Hills Project would result in a net reduction of approximately 12,503 metric tons CO_2e per year and there would be no long-term impacts associated with project-generated GHG emissions.

This impact would be less than significant.

Impact GHG-1c: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment—Patterson Pass Project (less than significant)

Construction of the Patterson Pass Project would occur over a period of approximately 9 months. It is estimated that there would be approximately 184 workdays that would include the use of heavy construction equipment. Construction activities at the project site would include the same phases, construction equipment, and truck trips as listed above for year-by-year implementation of the program, even though the overall construction activities at Patterson Pass are much less than the program as a whole.

Total GHG emissions associated with construction of the Patterson Pass Project have been estimated and are presented in Table 3.7-6. As discussed above, construction GHG exhaust emissions were estimated using CalEEMod (South Coast Air Quality Management District 2011) and the ARB EMFAC

[4] Calculation: 81.5 MW * 20% capacity * 8,760 hours per year = 142,788 MWh (baseline); 81.5 MW * 30% capacity * 8,760 hours per year = 214,182 MWh (Repowering Program). Difference = 71,394 MWh.

2011 model (California Air Resources Board 2013c). In addition, indirect GHG emissions associated with water use for dust control were estimated for the project by employing emission factors and assumptions from the CAPCOA GHG mitigation measure guidance document (California Air Pollution Control Officers Association 2010), and the Climate Registry (CR) (Climate Registry 2013a, 2013b).

Operational GHG emissions above baseline would consist of SF_6 leakage; these emissions were quantified using the same methods as discussed above for the program. As with the program, daily emissions associated with maintenance of the Patterson Pass Project would be similar to baseline conditions, and thus the potential increase or decrease in maintenance-related emissions would be negligible. However, operational emissions from offsite worker trips, maintenance activities, and electricity use were estimated. Emission sinks from partial reabsorption of CO_2 during the life of the concrete structures were also included as an emissions sink for operational activities (Portland Cement Association 2013). These emissions and are presented in Table 3.7-6.

Table 3.7-6. Patterson Pass Project Construction and Operation GHG Emissions for the Bay Area

	Estimated Total Emissions (metric tons)				
Construction Activity	CO_2	CH_4	N_2O	SF_6	CO_2e
Construction Activity (all years)					
Decommissioning and foundation removal	86.08	0.01	0.00	0.00	86.90
Laydown yards substations and switch yards	55.84	0.00	0.00	0.00	56.39
Road construction	80.00	0.01	0.00	0.00	80.77
Turbine foundations and batch plant [a]	355.57	0.01	0.01	0.00	357.48
Turbine delivery and installation	54.86	0.00	0.00	0.00	55.38
Utility collector line installation	38.46	0.00	0.00	0.00	38.80
Restoration and clean up	28.00	0.00	0.00	0.00	28.26
Offsite truck trips	623.46	0.01	0.03	0.00	633.26
Offsite worker trips	42.06	0.00	0.00	0.00	42.43
Electricity use	0.20	0.00	0.00	0.00	0.20
Water use—indirect emissions	2.10	0.00	0.00	0.00	2.11
Total	1,366.62	0.04	0.05	0.00	1,381.97
Amortized (per year for 30 years)					46.07
Operational Activity (per year)					
Offsite worker trips	5.59	0.00	0.00	0.00	5.64
Maintenance/operation	15.62	0.00	0.00	0.00	15.78
Electricity use	0.20	0.00	0.00	0.00	0.20
Circuit breaker leakage	0.00	0.00	0.00	0.00	5.63
Concrete carbonation	-0.22	0.00	0.00	0.00	-0.22
Total	21.20	0.00	0.00	0.00	27.03
Total construction and operation emissions (per year)					73.10
Annual GHG reductions from offsetting grid electricity					-3,110.73
Annual net GHG emissions					-3,037.63

Construction Activity	Estimated Total Emissions (metric tons) CO_2	CH_4	N_2O	SF_6	CO_2e
BAAQMD significance threshold					1,100
Significant impact?					No

[a] Includes direct emissions from construction activities for the construction phase along with indirect stationary CO_2 emissions associated with the manufacture of the concrete (offsite) used at the batch plants (onsite). Indirect emissions include fuel combustion emissions and calcination emissions.

As shown in Table 3.7-6, total GHG construction emissions in the form of CO_2e would be approximately 1,382 metric tons. These emissions amortized over a 30-year period equal approximately 46 metric tons per year. Adding to that the operation emissions of 27 metric tons CO_2e per year, total Patterson Pass Project GHG emissions would be approximately 73 metric tons CO_2e per year, which would be less than the BAAQMD's significance threshold of 1,100 metric tons CO_2e per year for non-stationary sources.

It also should be noted that total Patterson Pass GHG emissions would be immaterial compared to the GHG emissions that would be avoided by the increased wind energy the project would produce. By replacing older model turbines with new, more efficient ones, the Patterson Pass Project would reduce energy production-related contributions to climate change overall, relative to the existing facility, because it would contribute approximately 150% more power to the grid by installing turbines that are 50% more efficient than the existing turbines. The project would contribute approximately 17,000 MWh of additional wind-generated energy per year to the power grid compared to baseline conditions,[5] and would therefore replace the same amount of conventional (carbon-based) energy production. Using an emission factor of 329.9 pounds of CO_2e per MWh developed by PG&E for its current energy production portfolio (Climate Registry 2013b), it can be estimated that the Patterson Pass Project would result in an annual GHG emissions reduction of 3,111 metric tons CO_2e. Therefore, operation of the Patterson Pass Project would result in a net reduction of approximately 3,038 metric tons CO_2e per year and there would be no long-term impacts associated with project-generated GHG emissions.

This impact would be less than significant.

Impact GHG-2a-1: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases—program Alternative 1: 417 MW (less than significant with mitigation)

The program could conflict with certain GHG reduction goals set forth in AB 32, including the 39 Recommended Actions identified by ARB in its Climate Change Scoping Plan (California Air Resources Board 2008b). Of the 39 measures identified, those that would be considered to be applicable to the program would primarily be those actions related to transportation, the Renewables Portfolio Standard, and high global warming potential gases. Consistency of the program with these measures has been evaluated by each source-type measure below, and standard mitigation measures would be applied to projects within the program identified to reduce impacts as discussed.

[5] Calculation: 19.8 MW * 20% capacity * 8,760 hours per year = 34,690 MWh (baseline); 19.8 MW * 30% capacity * 8,760 hours per year = 52,034 MWh (Repowering Program). Difference = 17,345 MWh.

Scoping Plan Measure T-7: Heavy-Duty Vehicle GHG Emission Reduction (Aerodynamic Efficiency)—Discrete Early Action. This measure will require existing trucks/trailers to be retrofitted with the best available technology and/or ARB-approved technology. This measure has been identified as a Discrete Early Action, which means that it began to be enforceable starting in 2010. Technologies that reduce GHG emissions and improve the fuel efficiency of trucks may include devices that reduce aerodynamic drag and rolling resistance. The requirements would apply to California and out-of-state registered trucks that travel to California. This measure would require in-use trucks and trailers to comply through a phase-in schedule starting in 2010 and achieve 100% compliance by 2014. Construction of the program and the associated use of heavy-duty vehicles for hauling would occur from 2014–2018; therefore, it is possible that the program could conflict with compliance with this recommended action. Pursuant to Mitigation Measure GHG-2a (see below), the applicant would be required to retrofit existing trucks/trailers with the best available technology and/or ARB-approved technology consistent with Scoping Plan Measure T-7. Implementation of Mitigation Measure GHG-2a would ensure that the program would not conflict with implementation of Measure T-7.

Scoping Plan Measure E-3: Renewables Portfolio Standard (RPS). The RPS promotes multiple objectives, including diversifying the electricity supply. Increasing the RPS to 33% is designed to accelerate the transformation of the electricity sector, including investment in the transmission infrastructure and system changes to allow integration of large quantities of intermittent wind and solar generation. The program would add renewable wind-generated energy to the electricity supply and actually result in net GHG emission reductions (see Tables 3.7-3, 3.7-4, and 3.7-5). Therefore, the program would be consistent with this recommended action.

Scoping Plan Measure H-6: High Global Warming Potential Gas Reductions from Stationary Sources – SF_6 Leak Reduction and Recycling in Electrical Applications. This measure will reduce emissions of SF_6 within the electric utility sector and at particle accelerators by requiring the use of best achievable control technology for the detection and repair of leaks and the recycling of SF_6. This measure would establish a regulation mandating a performance standard. Utilities and other affected entities would comply by using leak detection and repair (LDAR) abatement equipment to reduce system leakage. The proposed performance standard would mandate and enhance current voluntary federal SF_6 recycling standards. The program would include installation of a new circuit breaker that would contain SF_6. Pursuant to Mitigation Measure GHG-2b (see below), the applicant would be required to install a circuit breaker with low SF_6 leak rates and monitor SF_6-containing circuit breakers consistent with Scoping Plan Measure H-6. Implementation of Mitigation Measure GHG-2b would ensure that the program would not conflict with implementation of Measure H-6.

The program could also conflict with certain GHG reduction goals set forth in the Alameda County Final Draft Climate Action Plan. Of the GHG reduction measures identified in the CCAP, those that would be considered to be applicable to the program would primarily be those actions related to building construction and solid waste generation. Consistency of the program with these measures has been evaluated by each source-type measure below.

CCAP Measure E-10: Require new construction to use building materials containing recycled content. This measure would encourage new developments to incorporate materials with recycled content, for which the sum of post-consumer recycled content plus one-half of the post-industrial content constitutes at least 10% of the total value of the materials in the project. No new substations are expected to be constructed as part of the program; however, existing substations will be reconstructed or expanded. Pursuant to Mitigation Measure GHG-2c (see below), the applicant would be required to use building materials containing 10% recycled content consistent with CCAP Measure E-10. Implementation of Mitigation Measure GHG-2c would ensure that the program would not conflict with implementation of CCAP Measure E-10.

CCAP Measure WS-2: Strengthen the Construction and Demolition Debris Management Ordinance. Alameda County's current Green Building Ordinance requires 75% of inert construction and demolition waste (e.g., concrete, asphalt, and stone) and 50% of all remaining designated project-related construction and demolition waste (e.g., wood, vegetative materials, and metals) to be recycled or reused. This measure will amend the ordinance to be consistent with the current Construction and Demolition model ordinance being support by CALGreen and StopWaste.org. The new waste diversion standards will include the following: 1) 100% of inert waste and 50% wood/vegetative/scrap metal not including Alternative Daily Cover (ADC) and unsalvageable material put to other beneficial uses at landfills; and 2) recycling and beneficial reuse of 100% of inert materials (concrete and asphalt). Pursuant to Mitigation Measure GHG-2d (see below), the applicant would be required to comply with the new waste diversion standards for construction and demolition debris consistent with CCAP Measure WS-2. Implementation of Mitigation Measure GHG-2d would ensure that the program would not conflict with implementation of CCAP Measure WS-2.

This impact would be significant, but implementation of Mitigation Measures GHG-2a through GHG-2d would reduce this impact to a less-than-significant level.

Mitigation Measure GHG-2a: Implement best available control technology for heavy-duty vehicles

The applicant will require existing trucks/trailers to be retrofitted with the best available technology and/or ARB-approved technology consistent with the ARB Truck and Bus Regulation (California Air Resources Board 2011). The ARB Truck and Bus Regulation applies to all diesel-fueled trucks and buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds.

Starting January 1, 2015, the applicant must replace lighter trucks (GVWR of 14,001 to 26,000 pounds) with engines that are 20 years or older with newer trucks. The Applicant has the option to install a PM filter retrofit on a lighter truck by 2014 to make the truck exempt from replacement until January 1, 2020, and any lighter truck equipped with a PM filter retrofit prior to July 2011 would receive credit toward the compliance requirements for a heavier truck or bus in the same fleet.

Starting January 1, 2012, the applicant is required to meet the engine model year schedule shown below for heavier trucks (GVWR greater than 26,000 pounds). To comply with the schedule, the applicant will install the best available PM filter on 1996 model year and newer engines and would replace the vehicle 8 years later. The Applicant will replace trucks with 1995 model year and older engines starting in 2015. Replacements with 2010 model year or newer engines meets the final requirements, but the applicant could also replace trucks with used trucks that would have a future compliance date on the schedule. For example, a replacement with a 2007 model year engine complies until 2023. By 2023 all trucks and buses must have 2010 model year engines with few exceptions.

Engine Model Year Schedule for Heavier Trucks	
Engine Year	**Requirement from January 1**
Pre-1994	No requirements until 2015, then 2010 engine
1994–1995	No requirements until 2016, then 2010 engine
1996–1999	PM filter from 2012 to 2020, then 2010 engine
2000–2004	PM filter from 2013 to 2021, then 2010 engine
2005–2006	PM filter from 2014 to 2022, then 2010 engine
2007–2009	No requirements until 2023, then 2010 engine
2010	Meets final requirements

In addition, the applicant could comply with a phase-in option that would allow the applicant to decide which vehicles to retrofit or replace, regardless of engine model year. The applicant must report information about all heavier trucks starting January 31, 2012, to use this option.

The Applicant could comply by demonstrating that trucks have met the percentage requirement each year as shown in the table below. For example, by 2012 the applicant's fleet would need to have PM filters on 30% of the heavier trucks in the fleet. This option counts 2007 model year and newer engines originally equipped with PM filters toward compliance and would reduce the overall number of retrofit PM filters needed. Any engine with a PM filter regardless of model year would be compliant until at least 2020. Beginning January 1, 2020, all heavier trucks would need to meet the requirements specified in the Compliance Schedule for Heavier Trucks.

Phase-In Option for Heavier Trucks	
Compliance Date	**Vehicles with PM Filters**
1-Jan-12	30%
1-Jan-13	60%
1-Jan-14	90%
1-Jan-15	90%
1-Jan-16	100%

Mitigation Measure GHG-2b: Install low SF_6 leak rate circuit breakers and monitoring

The applicant will ensure that any new circuit breaker installed at a substation has a guaranteed SF_6 leak rate of 0.5% by volume or less. The applicant will provide Alameda County with documentation of compliance, such as specification sheets, prior to installation of the circuit breaker. In addition, the applicant will monitor the SF_6-containing circuit breakers at the substation consistent with Scoping Plan Measure H-6 for the detection and repair of leaks.

Mitigation Measure GHG-2c: Require new construction to use building materials containing recycled content

The applicant will require the construction of all new substation and other permanent buildings to incorporate materials for which the sum of post-consumer recycled content plus one-half of the post-industrial content constitutes at least 10% of the total value of the materials in the project.

Mitigation Measure GHG-2d: Comply with construction and demolition debris management ordinance

The applicant will comply with the County's revised Green Building Ordinance regarding construction and demolition debris as follows: (1) 100% of inert waste and 50% wood/vegetative/scrap metal not including Alternative Daily Cover (ADC) and unsalvageable material will be put to other beneficial uses at landfills, and (2) 100% of inert materials (concrete and asphalt) will be recycled or put to beneficial reuse.

Impact GHG-2a-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases—program Alternative 2: 450 MW (less than significant with mitigation)

Program Alternative 2 could conflict with certain GHG reduction goals set forth in AB 32, including the 39 Recommended Actions identified by ARB in its Climate Change Scoping Plan (California Air Resources Board 2008b). These potential conflicts are the same as presented above for program Alternative 1 for Scoping Plan measures T-7, E-3, and H-6. Consistency of program Alternative 2 with these measures is reflected in the evaluation of program Alternative 1 by each source-type measure above. Implementation of Mitigation Measure GHG-2a (see above) would ensure that program Alternative 2 would not conflict with implementation of Measure T-7. Implementation of Mitigation Measure GHG-2b (see above) would ensure that program Alternative 2 would not conflict with implementation of Measure H-6.

Program Alternative 2 could also conflict with certain GHG reduction goals set forth in the Alameda County Final Draft Climate Action Plan. These potential conflicts are the same as presented above for the program Alternative 1. Consistency of program Alternative 2 with these measures is reflected in the evaluation of program Alternative 1 by each source-type measure above. Implementation of Mitigation Measure GHG-2c (see above) would ensure that program Alternative 2 would not conflict with implementation of CCAP Measure E-10 (see above). Implementation of Mitigation Measure GHG-2d would ensure that program Alternative 2 would not conflict with implementation of CCAP Measure WS-2.

This impact would be significant, but implementation of Mitigation Measures GHG-2a through GHG-2d would reduce this impact to a less-than-significant level.

Mitigation Measure GHG-2a: Implement best available control technology for heavy-duty vehicles

Mitigation Measure GHG-2b: Install low SF_6 leak rate circuit breakers and monitoring

Mitigation Measure GHG-2c: Require new construction to use building materials containing recycled content

Mitigation Measure GHG-2d: Comply with construction and demolition debris management ordinance

Impact GHG-2b: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases—Golden Hills Project (less than significant with mitigation)

The Golden Hills Project could conflict with certain GHG reduction goals set forth in AB 32, including the 39 Recommended Actions identified by ARB in its Climate Change Scoping Plan (California Air Resources Board 2008b). These potential conflicts are the same as presented above for the program for Scoping Plan measures T-7, E-3, and H-6. Consistency of the Golden Hills Project with these measures is reflected in the evaluation of the program by each source-type measure above. Implementation of Mitigation Measure GHG-2a (see above) would ensure that the Golden Hills Project would not conflict with implementation of Measure T-7. Implementation of Mitigation Measure GHG-2b (see above) would ensure that the Golden Hills Project would not conflict with implementation of Measure H-6.

The Golden Hills Project could also conflict with certain GHG reduction goals set forth in the Alameda County Final Draft Climate Action Plan. These potential conflicts are the same as presented above for the program. Consistency of the Golden Hills Project with these measures is reflected in the evaluation of the program by each source-type measure above. Implementation of Mitigation Measure GHG-2c (see above) would ensure that the Golden Hills Project would not conflict with implementation of CCAP Measure E-10 (see above). Implementation of Mitigation Measure GHG-2d would ensure that the Golden Hills Project would not conflict with implementation of CCAP Measure WS-2.

This impact would be significant, but implementation of Mitigation Measures GHG-2a through GHG-2d would reduce this impact to a less-than-significant level.

Mitigation Measure GHG-2a: Implement best available control technology for heavy-duty vehicles

Mitigation Measure GHG-2b: Install low SF_6 leak rate circuit breakers and monitoring

Mitigation Measure GHG-2c: Require new construction to use building materials containing recycled content

Mitigation Measure GHG-2d: Comply with construction and demolition debris management ordinance

Impact GHG-2c: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases—Patterson Pass Project (less than significant with mitigation)

The Patterson Pass Project could conflict with certain GHG reduction goals set forth in AB 32, including the 39 Recommended Actions identified by ARB in its Climate Change Scoping Plan (California Air Resources Board 2008b). These potential conflicts are the same as presented above for the program for Scoping Plan measures T-7, E-3, and H-6. Consistency of the Patterson Pass Project with these measures is reflected in the evaluation of the program by each source-type measure above. Implementation of Mitigation Measure GHG-2a (see above) would ensure that the Patterson Pass Project would not conflict with implementation of Measure T-7. Implementation of Mitigation Measure GHG-2b (see above) would ensure that the Patterson Pass Project would not conflict with implementation of Measure H-6.

The Patterson Pass Project could also conflict with certain GHG reduction goals set forth in the Alameda County Final Draft Climate Action Plan. These potential conflicts are the same as presented above for the program. Consistency of the Patterson Pass Project with these measures is reflected in the evaluation of the program by each source-type measure above. Implementation of Mitigation Measure GHG-2c (see above) would ensure that the Patterson Pass Project would not conflict with implementation of CCAP Measure E-10 (see above). Implementation of Mitigation Measure GHG-2d would ensure that the Patterson Pass Project would not conflict with implementation of CCAP Measure WS-2.

This impact would be significant, but implementation of Mitigation Measures GHG-2a through GHG-2d would reduce this impact to a less-than-significant level.

Mitigation Measure GHG-2a: Implement best available control technology for heavy-duty vehicles

Mitigation Measure GHG-2b: Install low SF_6 leak rate circuit breakers and monitoring

Mitigation Measure GHG-2c: Require new construction to use building materials containing recycled content

Mitigation Measure GHG-2d: Comply with construction and demolition debris management ordinance

3.7.3 References Cited

Alameda County. 2011. *Community Climate Action Plan – Final*. Available: http://www.acgov.org/cda/planning/landuseprojects/documents/110603_Alameda_CCAP.pdf. Accessed: July 10, 2013.

———. 2012. *Draft Climate Action Plan approved by Board of Supervisors for Environmental Review (June 2011)*. Available: http://www.acgov.org/cda/planning/landuseprojects/climateaction/. Accessed: July 10, 2013.

Bay Area Air Quality Management District. 2009. *Revised Draft Options and Justification Report: California Environmental Quality Act Thresholds of Significance*. Last Updated: October 2009. Available: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Revised%20Draft%20CEQA%20Thresholds%20%20Justification%20Report%20Oct%202009.ashx?la=en. Accessed: January 14, 2014.

———. 2010a. *California Environmental Quality Act Air Quality Guidelines*. Available: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Draft_BAAQMD_CEQA_Guidelines_May_2010_Final.ashx?la=en. Last Updated: May 2010. Accessed: July 10, 2013.

———. 2010b. So*urce Inventory of Bay Area Greenhouse Gas Emissions.* Available: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/Emission%20Inventory/regionalinventory2007_2_10.ashx. Accessed: June 27, 2013.

———. 2011. *California Environmental Quality Act Air Quality Guidelines*. Available: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20 CEQA%20Guidelines%20May%202011.ashx. Last Updated: May 2011. Accessed: July 10, 2013.

California Air Pollution Control Officers Association (CAPCOA). 2008. *CEQA and Climate Change, Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act*. Available: < http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA-White-Paper.pdf>. Accessed: February 4, 2014.

———. 2010. *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures*. Table WSW-3.1. Available: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf. Accessed: July 10, 2013.

California Air Resources Board. 2008b. *Climate Change Scoping Plan*. Pursuant to AB 32 The California Global Warming Solutions Act of 2006. December 2008. Available: http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. Accessed: July 11, 2013.

———. 2011. *Facts About Truck and Bus Regulation: Compliance Requirements Summary*. Last Updated: March 2011. Available: http://www.arb.ca.gov/msprog/onrdiesel/documents/FSRegSum.pdf. Accessed: July 11, 2013.

———. 2012a. News Release—California Air Resources Board Approves Advanced Clean Car Rules. Available: http://www.arb.ca.gov/newsrel/newsrelease.php?id=282. Accessed: June 27, 2013.

———. 2012b. *LCFS Injunction Lifted.* Available: http://www.arb.ca.gov/fuels/lcfs/LCFS_Stay_Granted.pdf. Accessed: June 27, 2013.

———. 2012c. *California Air Resources Board Quarterly Auction 1*. November 2012. Available:http://www.arb.ca.gov/cc/capandtrade/auction/november_2012/auction1_results_2012q4nov.pdf. Accessed: June 27, 2013.

———. 2013. *California Greenhouse Gas Inventory for 2000-2010 – by Category as Defined in the Scoping Plan*. Last Reviewed: March 21, 2013. Available: http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed: June 27, 2013.

———. 2013c. *Emission Factor Model (EMFAC) 2011*. Available: http://www.arb.ca.gov/msei/modeling.htm. Accessed: December 20, 2013.

Carbon Dioxide Information Analysis Center. 2013. Carbon Dioxide Information Analysis Center. Available: <http://cdiac.ornl.gov/pns/current_ghg.html>. Accessed: January 3, 2014.

Center for Climate and Energy Solutions. 2012. *The Greenhouse Effect*. Available: http://www.c2es.org/facts-figures/basics/greenhouse-effect. Accessed: June 27, 2013.

Climate Registry. 2013a. *The Climate Registry's 2013 Default Emission Factors*. Available: http://www.theclimateregistry.org/downloads/2013/04/2013-Climate-Registry-Default-Emissions-Factors.pdf. Last Updated: April 2, 2013. Accessed: July 10, 2013.

———. 2013b. *Member Reports: Complete, Accurate and Verified Carbon Footprints.* EPS Protocol Report for Pacific Gas & Electric for 2011. Available: http://tcrreports.org/reportingpage/. Last Updated: April 2, 2013. Accessed: June 20, 2013.

Contra Costa County. 2010. *Vasco Winds Repowering Project Draft Environmental Impact Report and Appendices*. December. Available: http://www.co.contra-costa.ca.us/DocumentCenter/Home/View/5349. Accessed: July 10, 2010.

Council on Environmental Quality. 2010. *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions*. Memorandum for Heads of Federal Departments and Agencies. February 18. Available: http://ceq.hss.doe.gov/nepa/regs/Consideration_of_Effects_of_GHG_Draft_NEPA_Guidance_FINAL_02182010.pdf. Accessed: June 27, 2013.

European Environmental Agency. 2013a. *Atmospheric concentration of Methane (ppb)*. Last Updated: September 20, 2013. Available: http://www.eea.europa.eu/data-and-maps/figures/atmospheric-concentration-of-ch4-ppb-1. Accessed: January 14, 2014.

———. 2013b. *Atmospheric concentration of Nitrous Oxide (ppb).* Last Updated: September 20, 2013. Available: http://www.eea.europa.eu/data-and-maps/figures/atmospheric-concentration-of-n2o-ppb-1. Accessed: January 14, 2014.

Georgetown Climate Center. 2012. *Summary of the Federal District Court's Order Enjoining California's Low Carbon Fuel Standard*. Available: http://www.georgetownclimate.org/sites/default/files/Summary_of_Court_Enjoining_CA_LCFS.pdf. Accessed: June 27, 2013.

Intergovernmental Panel on Climate Change. 2001. Atmospheric Chemistry and Greenhouse Gases. In *Climate Change 2001: Working Group I: The Scientific Basis.* Available: http://www.ipcc.ch/ipccreports/tar/wg1/pdf/TAR-04.PDF. Accessed: June 28, 2013.

———. 2007a. *Introduction*. In B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer, (eds.), *Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007.* Cambridge, U.K. and New York, NY, USA: Cambridge University Press. Available: http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter1.pdf. Accessed: June 28, 2013.

———. 2007b. *Climate Change 2007: The Physical Science Basis.* Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. 2.10.2 Direct Global Warming Potentials. Available: <http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html>. Accessed: January 2, 2014.

National Highway Traffic Safety Administration. 2012. *CAFÉ – Fuel Economy*. Available: http://www.nhtsa.gov/fuel-economy. Accessed: October 11, 2012.

National Oceanic and Atmospheric Administration. 2010. *Greenhouse Gases: Frequently Asked Questions*. Available: http://lwf.ncdc.noaa.gov/oa/climate/gases.html. Accessed: June 28, 2013.

——— 2013. *Trends in Atmospheric Carbon Dioxide*. Last Updated: December 2013. Available: http://www.esrl.noaa.gov/gmd/ccgg/trends/. Accessed: January 14, 2014.

Portland Cement Association. 2013. *Technical Brief: Green in Practice 102—Concrete, Cement, and CO_2*. Available: http://www.concretethinker.com/technicalbrief/Concrete-Cement-CO2.aspx. Accessed:

South Coast Air Quality Management District. 2008. *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans*. Available: http://www.aqmd.gov/hb/2008/December/081231a.htm. Last updated: November 26, 2008. Accessed: July 10, 2013.

———. 2011. California Emission Estimator Model (CalEEMod). User's Guide Version 2011.1—Appendix D Default Data Tables—Table 3.4. Developed by ENVIRON International Corporation in collaboration with SCAQMD and other California air districts. Available: http://www.caleemod.com/. Accessed: October 4, 2011.

U.S. Environmental Protection Agency. 2006. *SF_6 Leak Rates from High Voltage Circuit Breakers – U.S. EPA Investigates Potential Greenhouse Gas Emissions Source*. IEEE Power Engineering Society General Meeting, Montreal, Quebec, Canada, June 2006. Available: http://www.epa.gov/electricpower-sf6/documents/leakrates_circuitbreakers.pdf. Accessed: July 11, 2013.

———. 2013a. *High Global Warming Potential (GWP) Gases*. Available: http://epa.gov/climatechange/ghgemissions/gases/fgases.html. Accessed: June 26, 2013.

———. 2013b. *Draft Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2011: Executive Summary*. Available: http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2011-ES-Executive-Summary.pdf. Accessed: June 28, 2013.

U.S. Environmental Protection Agency, National Highway Traffic Safety Administration, and the California Air Resources Board. 2011a. *EPA and NHTSA Propose to Extend the National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks*. Available: http://www.epa.gov/oms/climate/documents/420f11038.pdf. Accessed: June 28, 2013.

———. 2011b. *2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards*. 49 CFR Parts 523, 531, 533, 536, and 537. Federal Register Vol. 76, No. 231. Available: http://www.gpo.gov/fdsys/pkg/FR-2011-12-01/pdf/2011-30358.pdf. Accessed: June 28, 2013.

3.8 Hazards and Hazardous Materials

This section describes the regulatory and environmental setting for hazards and hazardous materials in the program and project areas. It describes impacts involving hazards and hazardous materials that would result from implementation of the program and two individual projects. It also addresses general issues of public safety related to potential accidents, upset conditions including transport of materials, and airport-related safety hazards. Mitigation measures are prescribed where feasible and appropriate.

As defined by Section 25501 of the California Health and Safety Code (HSC), hazardous materials are those "that, because of their quantity, concentration, or physical or chemical characteristics, pose a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment."

Hazardous waste is a subset of hazardous materials and defined as:

> [W]astes that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may either cause, or significantly contribute to, an increase in mortality or an increase in serious illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed (HSC 101075).

Hazardous materials can be categorized as nonradioactive chemical materials, radioactive materials, and biohazardous materials. Nonradioactive chemical materials typically fall within the definitions of hazardous materials and hazardous waste, as defined above.

3.8.1 Existing Conditions

Regulatory Setting

Federal

Hazardous Materials and Waste Handling

The federal Resource Conservation and Recovery Act of 1976 (RCRA) established a "cradle-to-grave" regulatory program governing the generation, transportation, treatment, storage, and disposal of hazardous waste. Under RCRA, individual states may implement their own hazardous waste programs in lieu of RCRA as long as the state program is at least as stringent as federal RCRA requirements. In California, the Department of Toxic Substances Control (DTSC) regulates the generation, transportation, treatment, storage, and disposal of hazardous material waste. The hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills. These regulations also require hazardous materials users to prepare written plans, such as a Hazardous Materials Business Plan, that describe hazardous materials inventory information, storage and secondary containment facilities, emergency response and evacuation procedures, and employee hazardous materials training programs. A number of agencies participate in enforcing hazardous materials management requirements, including DTSC, the

Regional Water Quality Control Boards, and the Alameda County Department of Environmental Health's Hazardous Materials/Waste Program.

Transportation of Hazardous Materials and Oversized Loads

The U.S. Department of Transportation regulates hazardous materials transportation on all interstate roads. Within California, the state agencies with primary responsibility for enforcing federal and state regulations and for responding to transportation emergencies are the California Highway Patrol (CHP) and the California Department of Transportation (Caltrans). Together, federal and state agencies determine driver-training requirements, load-labeling procedures, and container specifications. Although special requirements apply to transporting hazardous materials, requirements for transporting hazardous waste are more stringent, and hazardous waste haulers must be licensed to transport hazardous waste on public roads.

Caltrans has the discretionary authority to issue special permits for the movement of vehicles/loads exceeding statutory limitations on the size, weight, and loading of vehicles contained in Division 15 of the California Vehicle Code. Requests for such special permits require the completion and application for a Transportation Permit.

Aviation Hazards

Federal Aviation Administration (FAA) Regulations (14 CFR 77) establish standards for what constitutes an obstruction to navigable airspace. Obstructions include any object if it is: (1) 500 feet above ground level; (2) 200 feet above ground level or above the established airport elevation, whichever is higher, within 3 nautical miles of an airport; and (3) above a height within a terminal obstacle clearance area or en route obstacle clearance area. In addition, California Public Utilities Code section 21659 prohibits hazards near airports (as defined by 14 CFR 77) unless a permit allowing the construction is issued by the Caltrans Division of Aeronautics. FAA requires a developer to file a Notice of Proposed Construction (Form 7460) for any structure greater than 200 feet above ground level. The form requires a proposal for marking and lighting of wind turbines and towers. FAA determines if the proposed project would create a hazard to navigable airspace and issues either a Determination of No Hazard or a Notice of Presumed Hazard.

State of California

California hazardous materials and wastes regulations are equal to or more stringent than federal regulations. The U.S. Environmental Protection Agency (EPA) has granted the state primary oversight responsibility to administer and enforce hazardous waste management programs. State regulations require planning and management to ensure that hazardous materials are handled, stored, and disposed of properly to reduce risks to human health and the environment. Several key state laws pertaining to hazardous materials and wastes are discussed below.

Worker Safety

Occupational safety standards exist in federal and state laws to minimize worker safety risks from both physical and chemical hazards in the work place. The California Division of Occupational Safety and Health (Cal/OSHA) and the federal Occupational Safety and Health Administration are the agencies responsible for assuring worker safety in the workplace.

Cal/OSHA assumes primary responsibility for developing and enforcing standards for safe workplaces and work practices within the state. At sites known to be contaminated, a site safety plan must be prepared to protect workers. The site safety plan establishes policies and procedures to protect workers and the public from exposure to potential hazards at the contaminated site.

Fire Protection

The California Public Resources Code (Section 4101 et seq.) includes fire safety requirements for which the Department of Forestry and Fire Protection (CAL FIRE) has adopted regulations (for example, Chapters 6 and 7 of Chapter 1.5 of 14 CCR) that apply to state responsibility areas (SRAs). As the name implies, SRAs are areas where CAL FIRE has primary responsibility for fire protection. During the fire hazard season, these regulations: (a) restrict the use of equipment that may produce a spark, flame, or fire; (b) require the use of spark arrestors[1] on equipment that has an internal combustion engine; (c) specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and (d) specify fire-suppression equipment that must be provided onsite for various types of work in fire-prone areas.

SRAs include much of the wildlands in unincorporated Alameda County. According to CAL FIRE's hazards area mapping, the program area is located in a zone that has a moderate to high risk for wildland fire hazards within the SRA (California Department of Forestry and Fire Protection 2007).

Local

Alameda County General Plan

The *Safety Element of the Alameda County General Plan* (Alameda County 2013) contains goals, policies, and actions the County might take related to nonnatural hazards and fire hazards. Many of the principles and actions refer to new development. Those relating to the proposed project as an existing facility are excerpted below.

Goal 2. To reduce the risk of urban and wildland fire hazards.

> **P3.** Development should generally be discouraged in areas of high wildland fire hazard where vegetation management programs, including the creation and maintenance of fuel breaks to separate urban uses would result in unacceptable impacts on open space, scenic and ecological conditions.

Goal 4. Minimize residents' exposure to the harmful effects of hazardous materials and waste.

> **P1.** Uses involving the manufacture, use or storage of highly flammable (or toxic) materials and highly water reactive materials should be located at an adequate distance from other uses and should be regulated to minimize the risk of on-site and off-site personal injury and property damage. The transport of highly flammable materials by rail, truck, or pipeline should be regulated and monitored to minimize risk to adjoining uses.

East County Area Plan

The ECAP contains the following goals, policies, and implementation programs related to fire protection.

---

[1] A spark arrestor is a device that prohibits exhaust gases from an internal combustion engine from passing through the impeller blades where they could cause a spark. A carbon trap commonly is used to retain carbon particles from the exhaust.

Hazard Zones

Goal: To minimize the risks to lives and property due to environmental hazards.

Policy 134: The County shall not approve new development in areas with potential natural hazards (flooding, geologic, wildland fire, or other environmental hazards) unless the County can determine that feasible measures will be implemented to reduce the potential risk to acceptable levels, based on site-specific analysis.

Environmental Health and Safety

Program 117: The County shall work with the California Department of Forestry and Fire Protection to designate "very high fire hazard severity zones" in conformance with AB 337 (1992). The County shall ensure that all zones designated as such meet the standards and requirements contained in this legislation.

Program 118: The County shall prepare a comprehensive wildland fire prevention program including fuelbreaks, brush management, controlled burning, and access for fire suppression equipment.

Alameda County Department of Environmental Health

The Alameda County Department of Environmental Health (ACDEH) is the Certified Unified Program Agency (CUPA) for Alameda County. This certification by the California Secretary of Environmental Protection authorizes the ACDEH to implement the Unified Hazardous Waste and Hazardous Materials Management Regulatory Program specified in Health and Safety Code Chapter 6.11 of Division 20 (beginning with Section 25404). As the CUPA, ACDEH oversees the regulatory programs for Hazardous Materials Business Plans, underground and aboveground storage tanks, onsite treatment of hazardous waste, hazardous waste generators, and California Accidental Release Prevention.

Alameda County Construction and Debris Management Ordinance

The Alameda County Construction and Debris Management Ordinance specifies how project-related construction and demolition waste is handled. The ordinance covers any project requiring a demolition permit and specifies the minimum requirements for diversion or salvage of waste. Projects covered under this ordinance are required to submit a debris management plan to the Alameda County Building Department.

Contra Costa County Airport Land Use Compatibility Plan

The Contra Costa Airport Land Use Compatibility Plan (ALUCP) is designed to promote compatibility between the airports in Contra Costa County and surrounding land uses. The ALUCP, as adopted by the Contra Costa County Airport Land Use Commission (ALUC), designates compatibility criteria applicable to local agencies in their preparation or amendment of land use plans and ordinances and to land owners in their design of new development.

The ALUCP is primarily concerned with land uses near the two public-use airports in the county, Buchanan Field Airport and Byron Airport.

Policies applicable to the program are excerpted below (Contra Costa County 2000).

6.5 Compatibility Zone "C1" Criteria

6.5.4 *Height Limitations* – Unless specific exemption is granted (see Countywide Policy 4.3.2), the height of objects within Compatibility Zone C1 shall be limited in accordance with the Byron Airport Airspace Protection Surfaces drawing (Figure 4A).

(a) Generally, there is no concern with regard to any object up to 100 feet tall unless it is located on high ground or it is a solitary object (e.g., an antenna) more than 35 feet taller than other nearby objects.

(b) ALUC review is required for any proposed object taller than 100 feet.

6.7. Compatibility Zone "D" Criteria

6.7.4. Height Limitations — See criteria for Compatibility Zone C1.

6.8 Height Exception Overlay Zone

6.8.1. *Height Limitations* — Unless a specific exemption is granted (see Countywide Policy 4.3.2), the height of objects within the Height Exception Overlay Zone shall be limited in accordance with the Byron Airport Airspace Protection Surfaces drawing (Figure 4A).

(a) Objects within this zone may exceed the height limits established in accordance with federal airspace protection standards if the height is less than that of nearby objects or terrain.

(b) Generally, there is no concern with regard to any object up to 50 feet tall unless it is located on high ground or it is a solitary object (e.g., an antenna) more than 35 feet taller than other nearby objects.

(c) ALUC review is required for any proposed object taller than 50 feet.

6.8.2. Other Development Conditions

(a) Dedication of an avigation easement to Contra Costa County shall be required as a condition for approval of any development in this zone having a height in excess of 50 feet. See Countywide Policy 4.3.3.

(b) All other criteria of the underlying compatibility zone shall apply.

Best Management Practices

As discussed under Chapter 3.6, *Geology and Soils*, any future project that would disturb 1 or more acres of soil, or would disturb less than 1 acre but is part of a larger common plan of development must obtain coverage under General Permit Order 2010-0014-DWQ. Coverage under the General Permit requires development and implementation of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP must include plans for erosion and sediment control and would adhere to the County's grading ordinance and BMPs. Typical construction erosion control BMPs are listed below.

- Perform clearing and earth moving activities only during dry weather.
- Limit construction access routes and stabilize designated access points.
- Prohibit cleaning, fueling, and maintaining vehicles onsite, except in a designated area where washwater is contained and treated.
- Properly store, handle, and dispose of construction materials/wastes to prevent contact with stormwater.
- Train and provide instruction to all employees/subcontractors on construction BMPs.

- Control and prevent discharge of all potential pollutants, including pavement cutting wastes, paints, concrete, petroleum products, chemicals, washwater or sediments, rinse water from architectural copper, and non-stormwater discharges to storm drains and watercourses.

Alameda County Wind Farm Standard Conditions

As discussed in Chapter 2, *Program Description*, there is no ordinance dictating setback conditions in Alameda County. Setback requirements originally developed for Alameda County windfarms in the 1980s and 1990s were typically applied to wind projects using older generation turbines; however, these requirements have been deemed inappropriate for the fourth-generation turbines proposed for repowering. Accordingly, the County has developed a set of updated standards to be used for proposed repowering projects. These are shown in Table 2-2.

Professional Standards for Environmental Site Assessments

The American Society of Testing and Materials (ASTM) established ASTM E 1527-00 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (Phase I ESA). The purpose of the ASTM standards is to identify, to the extent feasible, recognized environmental conditions in connection with a subject property. ASTM defines *recognized environmental condition* as the presence or likely presence of hazardous substances as defined by the federal Comprehensive Environmental Response, Compensation, and Liability Act, as well as conditions that indicate an existing release, a past release, or a material threat of a release of petroleum products into the ground, groundwater, or surface water.

According to ASTM, the Phase I ESA is a comprehensive assessment and is to be performed by an environmental professional. The duties of the environmental professional include three tasks: interviews and site reconnaissance, review and interpretation of information, and oversight of writing the report.

An environmental professional is defined as someone with at least one of the qualifications listed below.

- A current Professional Engineer's or Professional Geologist's license or registration from a state or U.S. territory with 3 years equivalent full-time experience.
- A Baccalaureate or higher degree from an accredited institution of higher education in a discipline of engineering or science and 5 years equivalent full-time experience.
- The equivalent of 10 years full-time experience.

Environmental Setting

Blade Throw

One potential hazard of wind turbine operation is blade throw. Blade throw can occur if all or part of a rotor blade detaches from the turbine, typically as a result of equipment failure or an extreme event such as lightning strike or high winds. The distance a blade is thrown depends on several factors: turbine height, topography, blade or blade fragment length, rotor speed, wind speed, and departure angle (Larwood and van Dam 2006). Blade fragments have the potential to fly farther than complete blades because the initial velocity at failure tends to be higher for a fragment than for a full blade. In general, blade throw takes place predominantly in the plane of rotation, not downwind; however, because turbine nacelles turn to face the wind, the potential hazard zone is considered as a radius of the potential blade throw distance with the tower as center point.

The average wind turbine height in the program area ranges from 18 to 55 meters for existing first- and second-generation turbines and from 65 to 88 meters for third-generation turbines. The turbine height of fourth-generation turbines proposed for repowering ranges from 121 to 153 meters. Using the setback requirements above, the minimum distance to ensure safety from blade throw hazard would be 459 meters from building sites and 918 meters from I-580 for the taller wind turbines.

Examination of the existing wind energy facilities indicates that approximately seven existing wind turbines are less than three times the turbine height from human structures (e.g., county roads and residences).

Nearby Schools and Airports

The nearest school to the project is Mountain House Elementary (3950 Mountain House Road, Byron), approximately 0.48 mile east of the APWRA. San Joaquin Delta College (2073 South Central Parkway) is approximately 0.5 mile east of the APWRA.

The nearest public use airport to the project areas is Byron Airport, 1.26 mile north of the APWRA, and the nearest private airstrip is Meadowlark Airfield, 3.16 miles south of the APWRA.

Fire Protection

Fire Protection Providers

The closest CAL FIRE station to the project area is the Castle Rock Station at 16502 Schulte Road in the city of Tracy, approximately 3 miles east of the eastern program area boundary. The Castle Rock Station is part of the CAL FIRE's Santa Clara Unit. This is a seasonal station generally operating during fire season, which typically extends from the middle of May through the end of October.

Crews and equipment from several different locations respond to wildland fires in the APWRA. According to Mike Martin (pers. comm. 2013), Battalion Chief of CAL FIRE Battalion 4, Santa Clara Unit, a typical CAL FIRE response to a full wildland dispatch would involve the resources listed below.

- Six 4-wheel-drive engines dispatched from Tracy, East Contra Costa, Sunol, and Patterson, each capable of holding 500 gallons of water.
- Two airtankers, each capable of holding 1,200 gallons of water.
- One helicopter from the Santa Clara Unit with a 6-person crew.
- One battalion chief.
- One to three water tender trucks, each capable of holding 2,000 gallons of water.
- Two bulldozers.
- 21 five-person hand crews dispatched from Delta Camp in Fairfield.
- One air tactical aircraft, a fixed-wing aircraft used as aerial command and control of aircraft on wildland fires, dispatched from Hollister.

Although the APWRA is under CAL FIRE jurisdiction, the Alameda County Fire Department (ACFD) would also respond to any wildland fire in the program area. The ACFD is a Consolidated Department with a total of 30 fire stations serving the unincorporated areas of Alameda County; the cities of San Leandro, Dublin, Newark, Union City; the Lawrence Berkeley National Laboratory; and the Lawrence Livermore National Laboratory. Services include fire suppression, arson investigation, hazardous materials mitigation, paramedic services, urban search and rescue, fire prevention, and public education.

Stations 20 and 8 are the two ACFD stations closest to the program area. Station 20 is located at the Lawrence Livermore Laboratory at 7000 East Avenue in Livermore, approximately 3 miles from the program area's western boundary. Station 20 employs two crews comprising eight firefighters, one Type III engine, two Type IV apparatus (patrols), a hazardous materials unit, and an ambulance (Alameda County Fire Department 2012). In addition to the Lawrence Livermore Laboratory, areas of responsibility include the Altamont Pass area to the city of Tracy boundaries and the eastern edge of the county (Alameda County Fire Department n.d.[a]).

Station 8, at 1617 College Avenue in the middle of Livermore, serves about 250 square miles of unincorporated rural area in east Alameda County and is responsible, in part, for the vast unincorporated area of the Altamont Pass. Typically, Station 8 would dispatch four engines, a 3,000-gallon water tender, and a battalion chief.

Engines hold 500–700 gallons of water and refill from the water tender (Berdan pers. comm.). If more water is needed, the water tender would locate the nearest fire hydrant which, depending of where the fire is located, could be as far as the city of Livermore (Berdan pers. comm.). There are also 5,000-gallon water tanks on some of the properties in the Altamont Pass (Alameda County Fire Department n.d.[b]). Finally, if necessary, helicopters could retrieve water from several reservoirs (e.g., Bethany, Clifton Court Forebay, Los Vaqueros) in and near the APWRA (Berdan pers. comm.).

The ACFD has an automatic aid agreement with the Livermore/Pleasanton Fire Department (LPFD), which will respond together with the ACFD if needed (Berdan pers. comm.). There is also a mutual aid agreement between the ACFD and the Tracy Rural Fire Department (TRFD) for the areas east of Grant Line Road on the eastern edge of the county line (Alameda County Fire Department n.d.[b]).

Fire Hazards

Five general categories of fire origin are associated with wind generators: hardware and conductor failures of power collection lines, dropping of collection lines, turbine malfunction or mechanical failure, construction-related accidents, and avian related incidents.

Wildfires related to power collection lines and malfunction or mechanical failure of turbines can result from turbine overload, bearing overheating, or pendant cable failure; such incidents occur primarily on older units. (A pendant cable is a collection of low-voltage and communication cables, which drop through the top of the turbine support structure and connect to a weather head or junction box at a lower level on the tower.) If not properly maintained, these cables may twist and bind or rub and cause an electrical short, emitting sparks or flames. On un-enclosed towers the sparks can escape the structure more easily. Avian-related incidents (i.e., electrocuted birds) involving birds catching fire and falling to the ground have also been a source of wind generator–related fires in the program area.

Fire prevention is required under the existing CUPs. Exhibit C of the 2005 CUPs describes the Altamont Pass Wind Farms Fire Requirements. The main mechanism for fire prevention is the maintenance of a 30-foot-wide firebreak around buildings and structures, including turbines, riser poles, and substations. Fire breaks around turbines may be constructed around a turbine string rather than individual turbines. Electrical lines require a 20-foot clearance of flammable vegetation. In Alameda County, this is accomplished by application of herbicide in October or November. A mechanism for fire prevention on turbines is the provision of a yaw damper or other approved method to prevent the over-twisting of pendant cables and the use of insulated and conductive materials to prevent avian electrocution. Exhibit C also requires year-round water supplies of at least 5,000 gallons to be provided for firefighting purposes in strategic locations throughout the subject project area as well as the preparation of an annual fire prevention plan. The fire prevention plan includes a map of facilities, water supply locations, and access routes.

In view of the fire hazard zoning and the state's jurisdiction over the program area related to fire protection, the statutory and regulatory public safety requirements to minimize the risk of wildland fire that are described above would apply to the program.

3.8.2 Environmental Impacts

Methods for Analysis

Evaluation of hazards and hazardous materials is based on information from published maps, reports, Alameda County general plan documents, the County's updated setback requirements, telephone interviews with fire protection agencies, and other documents that describe the potential for hazards and hazardous materials occurrence in the APWRA. No fieldwork or hazardous materials sites database searches were conducted for the proposed program. The analysis assumes that existing turbine facilities will continue to be operated consistent with the 2005 CUPs (and the 2007 CUP Amendments) until such time as each site is repowered or decommissioned.

Determination of Significance

In accordance with Appendix G of the State CEQA Guidelines, program Alternative 1, program Alternative 2, the Golden Hills project, or the Patterson Pass project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.
- Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment.
- Be located within an airport land use plan area or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area.

- Be located within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the project area.
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Impacts and Mitigation Measures

This section describes potential impacts related to hazards and hazardous materials that could result from implementation of the proposed program and projects.

Impact HAZ-1a-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials—program Alternative 1: 417 MW (less than significant)

Construction associated with Alternative 1 would involve small quantities of commonly used materials, such as fuels and oils, to operate construction equipment. However, because standard construction BMPs would be implemented to reduce pollutant emissions during construction, this impact is considered less than significant.

The majority of hazardous materials to be used during operations, decommissioning, and removal and reclamation activities—fuels, oils, and lubricants—are of low toxicity. As these materials are required for operation of construction vehicles and equipment, BMPs would be implemented to reduce the potential for or exposure to accidental spills involving the use of hazardous materials.

A small percentage (fewer than 10%) of generators to be removed could contain small amounts of asbestos (i.e., the 11-inch wire lead connection insulation/covering is made from asbestos). Additionally, in accordance with industry standards in practice at the time the turbines were built, the towers and nacelle machine components were likely originally coated with galvanized zinc, which contains trace amounts of lead. Disturbance of these materials could cause their release into the environment or endanger worker safety and health. However, wind turbines will be carefully disassembled and removed in a manner consistent with recycling and/or reselling the units. This procedure will help ensure that turbine components will not be damaged and release either lead or asbestos into the environment. The amount of lead and asbestos potentially encountered is very small and not likely to exceed lead or asbestos exposure levels in general construction regulations. Adherence to current BMPs designed to limit worker exposure to lead and/or asbestos will be implemented. These BMPs will be guided by OSHA's lead and asbestos standards as outlined in 29 CFR 1910.134 and 29 CFR 1926.1101.

Once construction is complete, there would be little use of hazardous materials or potential exposure associated with program Alternative 1. Dielectric fluid to be used in transformers is biodegradable, contains no PCBs, and is not considered a hazardous material. Accordingly, under this alternative the potential for hazardous materials to endanger the public or the environment is less than significant and no mitigation is required.

Impact HAZ-1a-2: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials—program Alternative 2: 450 MW (less than significant)

Construction associated with Alternative 2 would involve small quantities of commonly used materials, such as fuels and oils, to operate construction equipment. However, because standard construction BMPs would be implemented to reduce pollutant emissions during construction, this impact is considered less than significant.

The majority of hazardous materials to be used during operations, decommissioning, and removal and reclamation activities—fuels, oils, and lubricants—are of low toxicity. As these materials are required for operation of construction vehicles and equipment, BMPs would be implemented to reduce the potential for or exposure to accidental spills involving the use of hazardous materials.

A small percentage (fewer than 10%) of generators to be removed could contain small amounts of asbestos (i.e., the 11-inch wire lead connection insulation/covering is made from asbestos). Additionally, in accordance with industry standards in practice at the time the turbines were built, the towers and nacelle machine components were likely originally coated with galvanized zinc, which contains trace amounts of lead. Disturbance of these materials could cause their release into the environment or endanger worker safety and health. However, wind turbines will be carefully disassembled and removed in a manner consistent with recycling and/or reselling the units. This procedure will help ensure that turbine components will not be damaged and release either lead or asbestos into the environment. The amount of lead and asbestos potentially encountered is very small and not likely to exceed lead or asbestos exposure levels in general construction regulations. Adherence to current BMPs designed to limit worker exposure to lead and/or asbestos will be implemented. These BMPs will be guided by OSHA's lead and asbestos standards as outlined in 29 CFR 1910.134 and 29 CFR 1926.1101.

Once construction is complete, there would be little use of hazardous materials or potential exposure associated with program Alternative 2. Dielectric fluid to be used in transformers is biodegradable, contains no PCBs, and is not considered a hazardous material.

Accordingly, under this alternative the potential for hazardous materials to endanger the public or the environment is less than significant and no mitigation is required.

Impact HAZ-1b: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials—Golden Hills Project (less than significant)

Construction of the proposed project would involve small quantities of commonly used materials, such as fuels and oils, to operate construction equipment. However, because standard construction BMPs would be implemented to reduce pollutant emissions during construction, this impact is considered less than significant.

During construction, hazardous materials would be stored at one of the staging areas (use of extremely hazardous materials is not anticipated). Staging areas would be cleared of vegetation, graded, and covered with gravel. To minimize the potential for harmful releases of hazardous materials through spills or contaminated runoff, these substances would be stored within secondary containment areas in accordance with federal, state, and local requirements and permit conditions. Storage facilities for petroleum products would be constructed, operated, and maintained in accordance with the SPCC plan that would prepared and implemented for the proposed project (40 CFR 112), including engineering standards (e.g., secondary containment); administrative standards (e.g., training with special emphasis on spill prevention, standard operating procedures, inspections); and BMPs.

A Hazardous Materials Business Plan will be developed for the proposed project. The HMBP would contain specific information regarding the types and quantities of hazardous materials associated with project activities, as well as their production, use, storage, spill response, transport, and disposal.

A small percentage (fewer than 10%) of generators to be removed could contain small amounts of asbestos (i.e., the 11-inch wire lead connection insulation/covering is made from asbestos). Additionally, in accordance with industry standards in practice at the time the turbines were built, the towers and nacelle machine components were likely originally coated with galvanized zinc, which contains trace amounts of lead. Disturbance of these materials could cause their release into the environment or endanger worker safety and health. However, wind turbines will be carefully disassembled and removed in a manner consistent with recycling and/or reselling the units. This will help ensure that turbine components will not be damaged and release either lead or asbestos into the environment. The amount of lead and asbestos potentially encountered is very small and not likely to exceed lead or asbestos exposure in general construction regulations. Adherence to current BMPs designed to limit worker exposure to lead and/or asbestos will be implemented. These BMPs will be guided by OSHA's lead and asbestos standards as outlined in 29 CFR 1910.134 and 29 CFR 1926.1101.

Once construction is complete, there would be little use of hazardous materials or potential exposure associated with the project. Lubricants used in the turbine gearbox are potentially hazardous; however, the gearbox would be sealed to prevent lubricant leakage and would be sampled and tested periodically to confirm that it retains adequate lubricating properties. When the lubricants have degraded to the point where they no longer provide the needed lubricating properties, the gearbox would be drained, new lubricant would be added, and the used lubricants would be disposed of at an appropriate facility in accordance with all applicable laws and regulations.

Transformers contain oil for heat dissipation. The transformers are sealed and contain no PCBs or moving parts. The transformer oil would not be subject to periodic inspection and does not need replacement.

O&M vehicles would be properly maintained to minimize leaks of motor oils, hydraulic fluids, and fuels. During operation, O&M vehicles would be serviced and fueled at the existing O&M building (using fuel trucks) or at an offsite location. No storage tanks are located at the existing wind farm, and none are proposed for the proposed project. Accordingly, this impact would be less than significant. No mitigation is required.

Impact HAZ-1c: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials—Patterson Pass Project (less than significant)

Construction of the proposed project would involve small quantities of commonly used materials, such as fuels and oils, to operate construction equipment. However, because standard construction

BMPs would be implemented to reduce pollutant emissions during construction, this impact is considered less than significant.

The majority of hazardous materials to be used during operations, decommissioning, and removal and reclamation activities—fuels, oils, and lubricants—are of low toxicity. As these materials are required for operation of construction vehicles and equipment, BMPs would be implemented to reduce the potential for or exposure to accidental spills involving the use of hazardous materials.

A small percentage (fewer than 10%) of generators to be removed could contain small amounts of asbestos (i.e., the 11-inch wire lead connection insulation/covering is made from asbestos). Additionally, in accordance with industry standards in practice at the time the turbines were built, the towers and nacelle machine components were likely originally coated with galvanized zinc, which contains trace amounts of lead. Disturbance of these materials could cause their release into the environment or endanger worker safety and health. However, wind turbines will be carefully disassembled and removed in a manner consistent with recycling and/or reselling the units. This procedure will help ensure that turbine components will not be damaged and release either lead or asbestos into the environment. The amount of lead and asbestos potentially encountered is very small and not likely to exceed lead or asbestos exposure levels in general construction regulations. Adherence to current BMPs designed to limit worker exposure to lead and/or asbestos will be implemented. These BMPs will be guided by OSHA's lead and asbestos standards as outlined in 29 CFR 1910.134 and 29 CFR 1926.1101.

Once construction is complete, there would be little use of hazardous materials or potential exposure associated with the program. Dielectric fluid to be used in transformers is biodegradable, contains no PCBs, and is not considered a hazardous material. Accordingly, the potential for hazardous materials to endanger the public or the environment is less than significant, and no mitigation is required.

Impact HAZ-2a-1: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment—program Alternative 1: 417 MW (less than significant)

Site workers, the public, and the environment could be inadvertently exposed to preexisting onsite contaminants during project construction. Small quantities of potentially toxic substances (such as petroleum and other chemicals used to operate and maintain construction equipment) would be used in the program area and transported to and from the area during construction. During operation, larger quantities (more than 55 gallons of liquid, 500 pounds of solids, or 200 cubic feet of compressed gases) of fuel could be stored in individual project areas. In addition, fuel and other petroleum products could be stored onsite. Release of these hazardous materials into the environment would be a significant impact.

However, the handling and disposal of these materials would be governed according to regulations enforced by CUPA, Cal/OSHA, and DTSC, as previously discussed. In addition, regulations under the federal Clean Water Act require contractors to avoid allowing the release of materials into surface waters as part of their SWPPP and NPDES permit requirements (see Chapter 9, *Hydrology and Water Quality*, for a discussion of the CWA and SWPPPs). This regulatory scheme would ensure that safety measures and precautions are taken, thereby reducing any potential impacts associated with the accidental upset or release of hazardous materials. This impact would be less than significant, and no mitigation is required.

Impact HAZ-2a-2: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment—program Alternative 2: 450 MW (less than significant)

Site workers, the public, and the environment could be inadvertently exposed to preexisting onsite contaminants during project construction. Small quantities of potentially toxic substances (such as petroleum and other chemicals used to operate and maintain construction equipment) would be used in the program area and transported to and from the area during construction. During operation, larger quantities (more than 55 gallons of liquid, 500 pounds of solids, or 200 cubic feet of compressed gases) of fuel could be stored in individual project areas. In addition, fuel and other petroleum products could be stored onsite. Release of these hazardous materials into the environment would be a significant impact.

However, the handling and disposal of these materials would be governed according to regulations enforced by CUPA, Cal/OSHA, and DTSC, as previously discussed. In addition, regulations under the federal Clean Water Act require contractors to avoid allowing the release of materials into surface waters as part of their SWPPP and NPDES permit requirements (see Chapter 9, *Hydrology and Water Quality*, for a discussion of the CWA and SWPPPs). This regulatory scheme would ensure that safety measures and precautions are taken, thereby reducing any potential impacts associated with the accidental upset or release of hazardous materials. This impact would be less than significant, and no mitigation is required.

Impact HAZ-2b: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment—Golden Hills Project (less than significant)

Site workers, the public, and the environment could be inadvertently exposed to preexisting onsite contaminants during project construction. Small quantities of potentially toxic substances (such as petroleum and other chemicals used to operate and maintain construction equipment) would be used in the program area and transported to and from the area during construction. During operation, larger quantities (more than 55 gallons of liquid, 500 pounds of solids, or 200 cubic feet of compressed gases) of fuel could be stored in the project area. In addition, fuel and other petroleum products could be stored onsite. Release of these hazardous materials into the environment would be a significant impact.

However, as previously discussed, an HMBP would be developed for the proposed project. The HMBP would contain specific information regarding the types and quantities of hazardous materials, as well as production, use, storage, spill response, transport, and disposal of such materials. The handling and disposal of these materials would be governed according to regulations enforced by CUPA, Cal/OSHA, and DTSC, as previously discussed. In addition, regulations under the federal CWA require contractors to avoid allowing the release of materials into surface waters as part of their SWPPP and NPDES permit requirements (see Chapter 9, *Hydrology and Water Quality*, for a discussion of the CWA and SWPPPs). This regulatory scheme would ensure that safety measures and precautions are taken, thereby reducing any potential impacts associated with the accidental upset or release of hazardous materials. This impact would be less than significant, and no mitigation is required.

Impact HAZ-2c: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment—Patterson Pass Project (less than significant)

Site workers, the public, and the environment could be inadvertently exposed to preexisting onsite contaminants during project construction. Small quantities of potentially toxic substances (such as petroleum and other chemicals used to operate and maintain construction equipment) would be used in the project area and transported to and from the area during construction. During operation, larger quantities (more than 55 gallons of liquid, 500 pounds of solids, or 200 cubic feet of compressed gases) of fuel could be stored in the project area. In addition, fuel and other petroleum products could be stored onsite. Release of these hazardous materials into the environment would be a significant impact.

However, as previously discussed, an HMBP would be developed for the proposed project. The HMBP would contain specific information regarding the types and quantities of hazardous materials, as well as production, use, storage, spill response, transport, and disposal of such materials. The handling and disposal of these materials would be governed according to regulations enforced by CUPA, Cal/OSHA, and DTSC, as previously discussed. In addition, regulations under the federal CWA require contractors to avoid allowing the release of materials into surface waters as part of their SWPPP and NPDES permit requirements (see Chapter 9, *Hydrology and Water Quality*, for a discussion of the CWA and SWPPPs). This regulatory scheme would ensure that safety measures and precautions are taken, thereby reducing any potential impacts associated with the accidental upset or release of hazardous materials. This impact would be less than significant, and no mitigation is required.

Impact HAZ-3a-1: Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school—program Alternative 1: 417 MW (no impact)

There are no public or private K–12 schools within 0.25 mile of the program area. The nearest school is approximately 0.48 mile east of proposed wind facilities and it is unlikely that hazardous materials would be emitted or released within 0.25 mile of any schools. Also, implementation of the SWPPP by contractors would reduce the potential of a hazardous spill incident. There would be no impact.

Impact HAZ-3a-2: Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school—program Alternative 2: 450 MW (no impact)

There are no public or private K–12 schools within 0.25 mile of the program area. The nearest school is approximately 0.48 mile east of proposed wind facilities and it is unlikely that hazardous materials would be emitted or released within 0.25 mile of any schools. Also, implementation of the SWPPP by contractors would reduce the potential of a hazardous spill incident. There would be no impact.

Impact HAZ-3b: Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school—Golden Hills Project (no impact)

There are no public or private K–12 schools within 0.25 mile of the project area. The nearest school is approximately 0.48 mile east of proposed wind facilities and it is unlikely that hazardous materials would be emitted or released within 0.25 mile of any schools. Also, implementation of the SWPPP by contractors would reduce the potential of a hazardous spill incident. There would be no impact.

Impact HAZ-3c: Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school—Patterson Pass Project (no impact)

There are no public or private K–12 schools within 0.25 mile of the project area. The nearest school is approximately 0.50 mile east of proposed wind facilities and it is unlikely that hazardous materials would be emitted or released within 0.25 mile of any schools. Also, implementation of the SWPPP by contractors would reduce the potential of a hazardous spill incident. There would be no impact.

Impact HAZ-4a-1: Location on a hazardous materials site, creating a significant hazard to the public or the environment—program Alternative 1: 417 MW (less than significant with mitigation)

It is not known if hazardous materials sites are present. However, the potential for the existence of hazardous materials is generally low. Land uses in the APWRA include agriculture, grazing, riding and hiking trails, and windfarms. Some of these land uses involve the use of potentially hazardous materials (e.g., fertilizer). Because soil disturbance would be involved in construction activities for both decommissioning activities and construction of individual wind projects, any contaminated soil found could represent a significant risk to human health and the environment. This impact would be significant, but implementation of Mitigation Measure HAZ-4a would reduce this impact to a less-than-significant level.

All projects requiring a CUP from the County would be bound by the program. Therefore, future repowering projects would require County permit approval of new CUPs, and Mitigation Measure HAZ-4 would become a standard condition of approval for the CUP.

Mitigation Measure HAZ-4: Perform a Phase I Environmental Site Assessment prior to construction activities and remediate if necessary

Prior to construction, the project proponent will conduct a Phase I environmental site assessment in conformance with the American Society for Testing and Materials Standard Practice E1527-05. All environmental investigation, sampling, and remediation activities associated with properties in the project area will be conducted under a work plan approved by the regulatory oversight agency and will be conducted by the appropriate environmental professional consistent with Phase I site assessment requirements as detailed below. The results of any investigation and/or remediation activities conducted in the project area will be included in the project-level EIR.

A Phase I environmental site assessment should, at a minimum, include the components listed below.

- An onsite visit to identify current conditions (e.g., vegetative dieback, chemical spill residue, presence of above- or underground storage tanks).
- An evaluation of possible risks posed by neighboring properties.
- Interviews with persons knowledgeable about the site's history (e.g., current or previous property owners, property managers).
- An examination of local planning files to check prior land uses and any permits granted.
- File searches with appropriate agencies (e.g., State Water Resources Control Board, fire department, County health department) having oversight authority relative to water quality and groundwater and soil contamination.
- Examination of historical aerial photography of the site and adjacent properties.
- A review of current and historic topographic maps of the site to determine drainage patterns.
- An examination of chain-of-title for environmental liens and/or activity and land use limitations.

If the Phase I environmental site assessment indicates likely site contamination, a Phase II environmental site assessment will be performed (also by an environmental professional).

A Phase II environmental site assessment would comprise the following.

- Collection of original surface and/or subsurface samples of soil, groundwater, and building materials to analyze for quantities of various contaminants.
- An analysis to determine the vertical and horizontal extent of contamination (if the evidence from sampling shows contamination).

If contamination is uncovered as part of Phase I or II environmental site assessments, remediation will be required. If materials such as asbestos-containing materials, lead-based paint, or PCB-containing equipment are identified, these materials will be properly managed and disposed of prior to or during the demolition process.

Any contaminated soil identified on a project site must be properly disposed of in accordance with DTSC regulations in effect at the time.

Hazardous wastes generated by the proposed project will be managed in accordance with the California Hazardous Waste Control Law (HSC, Division 20, Chapter 6.5) and the Hazardous Waste Control Regulation (Title 22, CCR, Division 4.5).

If, during construction/demolition of structures, soil or groundwater contamination is suspected, the construction/demolition activities will cease and appropriate health and safety procedures will be implemented, including the use of appropriate personal protective equipment (e.g., respiratory protection, protective clothing, helmets, goggles).

Impact HAZ-4a-2: Location on a hazardous materials site, creating a significant hazard to the public or the environment—program Alternative 2: 450 MW (less than significant with mitigation)

It is not known if hazardous materials sites are present. However, the potential for the existence of hazardous materials is generally low. Land uses in the APWRA include agriculture, grazing, riding and hiking trails, and windfarms. Some of these land uses involve the use of potentially hazardous materials (e.g., fertilizer). Because soil disturbance would be involved in construction activities for both decommissioning activities and construction of individual wind projects, any contaminated soil found could represent a significant risk to human health and the environment. This impact would be significant, but implementation of Mitigation Measure HAZ-4a would reduce this impact to a less-than-significant level.

All projects requiring a CUP from the County would be bound by the program. Therefore, future repowering projects would require County permit approval of new CUPs, and Mitigation Measure HAZ-4 would become a standard condition of approval for the CUP.

Mitigation Measure HAZ-4: Perform a Phase I Environmental Site Assessment prior to construction activities and remediate if necessary

Impact HAZ-4b: Location on a hazardous materials site, creating a significant hazard to the public or the environment—Golden Hills Project (less than significant with mitigation)

It is not known if hazardous materials sites are present. However, the potential for the existence of hazardous materials is generally low. Land uses in the APWRA include agriculture, grazing, riding and hiking trails, and windfarms. Some of these land uses involve the use of potentially hazardous materials (e.g., fertilizer). Because soil disturbance would be involved in construction activities for both decommissioning activities and construction of the proposed project, any contaminated soil found could represent a significant risk to human health and the environment. This impact would be significant, but implementation of Mitigation Measure HAZ-4a would reduce this impact to a less-than-significant level.

All projects requiring a CUP from the County would be bound by the program. Therefore, the proposed project would require County permit approval of new CUPs, and Mitigation Measure HAZ-4 would become a standard condition of approval for the CUP.

Mitigation Measure HAZ-4: Perform a Phase I Environmental Site Assessment prior to construction activities and remediate if necessary

Impact HAZ-4c: Location on a hazardous materials site, creating a significant hazard to the public or the environment—Patterson Pass Project (less than significant with mitigation)

It is not known if hazardous materials sites are present. However, the potential for the existence of hazardous materials is generally low. Land uses in the APWRA include agriculture, grazing, riding and hiking trails, and windfarms. Some of these land uses involve the use of potentially hazardous materials (e.g., fertilizer). Because soil disturbance would be involved in construction activities for both decommissioning activities and construction of the proposed project, any contaminated soil found could represent a significant risk to human health and the environment. This impact would be significant, but implementation of Mitigation Measure HAZ-4 would reduce this impact to a less-than-significant level.

All projects requiring a CUP from the County would be bound by the program. Therefore, the proposed project would require County permit approval of new CUPs, and Mitigation Measure HAZ-4 would become a standard condition of approval for the CUP.

Mitigation Measure HAZ-4: Perform a Phase I Environmental Site Assessment prior to construction activities and remediate if necessary

Impact HAZ-5a-1: Location within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard for people residing or working in the project area—program Alternative 1: 417 MW (less than significant with mitigation)

The closest public airport to the proposed project is the Byron Airport, located approximately 2.08 miles northeast of the program area boundary. Because the project area is not within 2 miles of a public airport, implementation of the proposed project would not generally result in a safety hazard for people residing or working in the project area. Also, as discussed in Chapter 2, *Project Description*, all repower wind turbines would require FAA lighting as most would be more than 200 feet tall and must be individually lit with obstruction lighting. Through its Notice of Proposed Construction or Alteration (Form 7460.1), the FAA would review the proposed projects prior to construction (14 CFR Part 77). The FAA analysis would include a review of proposed marking (paint scheme) and nighttime lighting to ensure that aircraft could readily identify and avoid the wind turbines. Compliance with FAA requirements would reduce the majority of the projects' potential aviation safety impacts to an acceptable level of risk.

However, the northeastern corner of the program area is within the Byron Airport influence area in Compatibility Zones C-1 and D and the Height Exception Overlay Zone. Applicable policies as previously described specify height limitations for this area. These policies stipulate consultation with and review by the Contra Costa ALUC for any proposed object taller than 100 feet. Construction of structures more than 100 feet above ground level within the airport influence zones could cause an obstruction or hazard to air navigation. Implementation of Mitigation Measure HAZ-5, would reduce this impact to a less-than-significant level.

Mitigation Measure HAZ-5: Coordinate with the Contra Costa ALUC prior to final design

If wind turbines are proposed to be constructed within the Byron Airport influence area zones, the project proponent will coordinate and consult with the Contra Costa County Airport Land Use Commission and request review and obtain approval of the final design and placement of wind turbines. In addition, the project proponent will incorporate any ALUC recommendations in to the final design.

Impact HAZ-5a-2: Location within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard for people residing or working in the project area—program Alternative 2: 450 MW (less than significant with mitigation)

The closest public airport to the proposed project is the Byron Airport, located approximately 2.08 miles northeast of the program area. Because the project area is not within 2 miles of a public airport, implementation of the proposed project would not generally result in a safety hazard for people residing or working in the project area. Also, as discussed in Chapter 2, *Project Description*, all repower wind turbines would require FAA lighting as most would be more than 200 feet tall and must be individually lit with obstruction lighting. Through its Notice of Proposed Construction or Alteration (Form 7460.1), the FAA would review the proposed projects prior to construction (14 CFR Part 77). The FAA analysis would include a review of proposed marking (paint scheme) and nighttime lighting to ensure that aircraft could readily identify and avoid the wind turbines. Compliance with FAA requirements would reduce the majority of the projects' potential aviation safety impacts to an acceptable level of risk.

However, the northeastern corner of the program area is within the Byron Airport influence area in Compatibility Zones C-1 and D and the Height Exception Overlay Zone. Applicable policies as previously described, specify height limitations for this area. These policies stipulate consultation with and review by the Contra Costa ALUC for any proposed object taller than 100 feet. Construction of structures more than 100 feet above ground level within the airport influence zones could cause an obstruction or hazard to air navigation. Implementation of Mitigation Measure HAZ-5 would reduce this impact to a less-than-significant level.

Mitigation Measure HAZ-5: Coordinate with the Contra Costa ALUC prior to final design

Impact HAZ-5b: Location within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard for people residing or working in the project area—Golden Hills Project (less than significant)

The closest public airport to the proposed project is the Byron Airport, approximately 6.5 miles northeast of the project area. Because the project area is not within 2 miles of a public airport, implementation of the proposed project would not generally result in a safety hazard for people residing or working in the project area. Also, as discussed in Chapter 2, *Project Description*, all repower wind turbines would require FAA lighting as most would be more than 200 feet tall and must be individually lit with obstruction lighting. Through its Notice of Proposed Construction or Alteration (Form 7460.1), the FAA would review the proposed projects prior to construction (14 CFR Part 77). The FAA analysis would include a review of proposed marking (paint scheme) and nighttime lighting to ensure that aircraft could readily identify and avoid the wind turbines. Compliance with FAA requirements would reduce the majority of the project's potential aviation safety impacts to an acceptable level of risk.

Impact HAZ-5c: Location within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard for people residing or working in the project area—Patterson Pass Project (less than significant)

The closest public airport to the proposed project is the Byron Airport, located approximately 6.5 miles north of the project area. Because the project area is not within 2 miles of a public airport, implementation of the proposed project would not generally result in a safety hazard for people residing or working in the project area. Also, as discussed in Chapter 2, *Project Description*, all repower wind turbines would require FAA lighting as most would be more than 200 feet tall and must be individually lit with obstruction lighting. Through its Notice of Proposed Construction or Alteration (Form 7460.1), the FAA would review the proposed projects prior to construction (14 CFR Part 77). The FAA analysis would include a review of proposed marking (paint scheme) and nighttime lighting to ensure that aircraft could readily identify and avoid the wind turbines.

Compliance with FAA requirements would reduce the project's potential aviation safety impacts to an acceptable level of risk and therefore to a less-than-significant level.

Impact HAZ-6a-1: Location within the vicinity of a private airstrip, resulting in a safety hazard for people residing or working in the project area—program Alternative 1: 417 MW (less than significant)

The program area boundary is approximately 2.43 miles northeast of the Meadowlark Airstrip, the nearest known private airstrip. Because the program area is not within 2 miles of a private airstrip, implementation of program Alternative 1 would not generally result in a safety hazard for people residing or working in the program area. Also, as discussed in Chapter 2, *Project Description*, all repower wind turbines would require FAA lighting as most would be more than 200 feet tall and must be individually lit with obstruction lighting. Through its Notice of Proposed Construction or Alteration (Form 7460.1), the FAA would review the proposed projects prior to construction (14 CFR Part 77). The FAA analysis would include a review of proposed marking (paint scheme) and nighttime lighting to ensure that aircraft could readily identify and avoid the wind turbines. Compliance with FAA requirements would reduce the projects' potential aviation safety impacts to an acceptable level of risk and therefore to a less-than-significant level.

Impact HAZ-6a-2: Location within the vicinity of a private airstrip, resulting in a safety hazard for people residing or working in the project area—program Alternative 2: 450 MW (less than significant)

The program area boundary is approximately 2.43 miles northeast of the Meadowlark Airstrip, the nearest known private airstrip. Because the program area is not within 2 miles of a private airstrip, implementation of program Alternative 2 would not generally result in a safety hazard for people residing or working in the program area. Also, as discussed in Chapter 2, *Project Description*, all repower wind turbines would require FAA lighting as most would be more than 200 feet tall and must be individually lit with obstruction lighting. Through its Notice of Proposed Construction or Alteration (Form 7460.1), the FAA would review the proposed projects prior to construction (14 CFR Part 77). The FAA analysis would include a review of proposed marking (paint scheme) and nighttime lighting to ensure that aircraft could readily identify and avoid the wind turbines. Compliance with FAA requirements would reduce the projects' potential aviation safety impacts to an acceptable level of risk and therefore to a less-than-significant level.

Impact HAZ-6b: Location within the vicinity of a private airstrip, resulting in a safety hazard for people residing or working in the project area—Golden Hills Project (less than significant)

The project area is approximately 8 miles northeast of the Meadowlark Airstrip. Because the project area is not within 2 miles of a private airstrip, implementation of the project would not generally result in a safety hazard for people residing or working in the project area. Also, as discussed in Chapter 2, *Project Description*, all repower wind turbines would require FAA lighting as most would be more than 200 feet tall and must be individually lit with obstruction lighting. Through its Notice of Proposed Construction or Alteration (Form 7460.1), the FAA would review the proposed projects prior to construction (14 CFR Part 77). The FAA analysis would include a review of proposed marking (paint scheme) and nighttime lighting to ensure that aircraft could readily identify and avoid the wind turbines. Compliance with FAA requirements would reduce the project's potential aviation safety impacts to an acceptable level of risk and therefore to a less-than-significant level.

Impact HAZ-6c: Location within the vicinity of a private airstrip, resulting in a safety hazard for people residing or working in the project area—Patterson Pass Project (less than significant)

The project area is approximately 3.42 miles northeast of the Meadowlark Airstrip. Because the program area is not within 2 miles of a private airstrip, implementation of the program would not generally result in a safety hazard for people residing or working in the program area. Also, as discussed in Chapter 2, *Project Description*, all repower wind turbines would require FAA lighting as most would be more than 200 feet tall and must be individually lit with obstruction lighting. Through its Notice of Proposed Construction or Alteration (Form 7460.1), the FAA would review the proposed projects prior to construction (14 CFR Part 77). The FAA analysis would include a review of proposed marking (paint scheme) and nighttime lighting to ensure that aircraft could readily identify and avoid the wind turbines. Compliance with FAA requirements would reduce the project's potential aviation safety impacts to an acceptable level of risk and therefore to a less-than-significant level.

Impact HAZ-7a-1: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan—program Alternative 1: 417 WM (less than significant with mitigation)

Existing vehicular traffic is associated with operations and maintenance of project facilities and is not anticipated to change under program Alternative 1. Accordingly, operation of the program would have no impact. During construction, there would be an increase in vehicular traffic transporting work crews, equipment, and materials.

As specified in Section 3.15, *Transportation/Traffic*, a Traffic Control Plan (TCP) would be prepared for each proposed repowering project to reduce hazards that could result from the increased truck traffic, and to ensure that traffic flow on local public roads and highways would not be adversely affected. This plan would incorporate measures such as informational signs, traffic cones, and flashing lights to identify any necessary changes in temporary land configuration. Flaggers with two-way radios would be used to control construction traffic and reduce the potential for accidents along roads. Speed limits would be set commensurate with road type, traffic volume, vehicle type, and site-specific conditions as necessary to ensure safe and efficient traffic flow.

Projects proposed within the unincorporated area of the county are reviewed by the Alameda County Fire Department during the building permit process to ensure that they are consistent with adopted emergency response plans and emergency evacuation plans. Consequently, the proposed project would not conflict with any adopted emergency response plan or emergency evacuation plan.

Finally, conveyance of decommissioned turbines, towers, and other components on public roads would take place at an irregular, infrequent rate, and would be subject to standard California Department of Transportation (Caltrans) regulations. Such conveyance would not hinder emergency access to the program area. Accordingly, decommissioning activities would not conflict with any adopted emergency response plan or emergency evacuation plan. Implementation of Mitigation Measure TRA-1 would reduce potential impacts to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact HAZ-7a-2: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan—program Alternative 2: 450 WM (less than significant with mitigation)

Existing vehicular traffic is associated with operations and maintenance of project facilities and is not anticipated to change under program Alternative 2. Accordingly, operation of the program would have no impact. During construction, there would be an increase in vehicular traffic transporting work crews, equipment, and materials.

As specified in Section 3.15, *Transportation/Traffic*, a Traffic Control Plan (TCP) would be prepared for each proposed repowering project to reduce hazards that could result from the increased truck traffic, and to ensure that traffic flow on local public roads and highways would not be adversely affected. This plan would incorporate measures such as informational signs, traffic cones, and flashing lights to identify any necessary changes in temporary land configuration. Flaggers with two-way radios would be used to control construction traffic and reduce the potential for accidents along roads. Speed limits would be set commensurate with road type, traffic volume, vehicle type, and site-specific conditions as necessary to ensure safe and efficient traffic flow.

Projects proposed within the unincorporated area of the county are reviewed by the Alameda County Fire Department during the building permit process to ensure that they are consistent with adopted emergency response plans and emergency evacuation plans. Consequently, the proposed project would not conflict with any adopted emergency response plan or emergency evacuation plan.

Finally, conveyance of decommissioned turbines, towers, and other components on public roads would take place at an irregular, infrequent rate, and would be subject to standard California Department of Transportation (Caltrans) regulations. Such conveyance would not hinder emergency access to the program area. Accordingly, decommissioning activities would not conflict with any adopted emergency response plan or emergency evacuation plan. Implementation of Mitigation Measure TRA-1 would reduce potential impacts to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact HAZ-7b: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan—Golden Hills Project (less than significant with mitigation)

Existing vehicular traffic is associated with operations and maintenance of project facilities and is not anticipated to change under the proposed project. Accordingly, operation of the project would have no impact. During construction, there would be an increase in vehicular traffic transporting work crews, equipment, and materials. A Traffic Management Plan would be prepared for the proposed project to reduce hazards that could result from the increased truck traffic, and to ensure that traffic flow on local public roads and highways would not be adversely affected. This plan would incorporate measures such as informational signs, traffic cones, and flashing lights to identify any necessary changes in temporary land configuration. Flaggers with two-way radios would be used to control construction traffic and reduce the potential for accidents along roads. Speed limits would be set commensurate with road type, traffic volume, vehicle type, and site-specific conditions as necessary to ensure safe and efficient traffic flow. Projects proposed within the unincorporated area of the county are reviewed by the Alameda County Fire Department during the building permit process to ensure that they are consistent with adopted emergency response plans and emergency evacuation plans. Consequently, the proposed project would not conflict with any adopted emergency response plan or emergency evacuation plan. Finally, conveyance of decommissioned turbines, towers and other components on public roads would occur at an irregular, infrequent rate, and would be subject to standard Caltrans regulations. Such conveyance would not hinder emergency access to the project area. Implementation of Mitigation Measure TRA-1 would reduce potential impacts to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact HAZ-7c: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan—Patterson Pass Project (less than significant)

Existing vehicular traffic is associated with operations and maintenance of project facilities and is not anticipated to change under the proposed project. Accordingly, operation of the project would have no impact. During construction, there would be an increase in vehicular traffic transporting work crews, equipment, and materials. Construction traffic routing would be established in a Construction Traffic Plan, which would include a traffic safety and signing plan prepared by the project engineers in coordination with Alameda County and other related agencies. The plan would define hours, routes, and safety and management requirements. EDF would obtain all necessary permits and regulatory approvals subject to review under applicable law. The proposed project would therefore not conflict with any adopted emergency response plan or emergency evacuation plan. Finally, conveyance of decommissioned turbines, towers and other components on public roads would occur at an irregular, infrequent rate, and would be subject to standard Caltrans regulations. Such conveyance would not hinder emergency access to the project area. Implementation of Mitigation Measure TRA-1 would reduce potential impacts to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact HAZ-8a-1: Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands—program Alternative 1: 417 WM (less than significant)

The program area consists primarily of grassland and grazing land. Dry climate conditions create circumstances rich with fuels, although active grazing, agricultural irrigation, and landscape irrigation provide some fuel reduction. Human activities are the primary reason wildfires start, although lightning strikes do occasionally occur. As discussed above, the most likely source of an ignition from the project would be hardware and/or conductor failures of power collection lines, dropping of collection lines, turbine malfunction or mechanical failure, and avian-related incidents.

Program Alternative 1 would entail the removal of existing turbines and installation of new turbines. Decommissioning and removing existing wind turbines would require additional work crews, temporarily increasing the number of vehicles in the individual project areas. Climate conditions together with the potential for vehicle-related ignitions make this a concern, especially during the summer months.

The potential for wildland fires already exists in the program area due to the presence of the wind energy facilities. Because CAL FIRE and ACFD already provide fire protection services to the program area, the fire protection facilities and infrastructure required to protect the existing facilities are in place. The program would not alter the Altamont Pass Wind Farms Fire Requirements as described in Exhibit C of the 2005 CUPs. Consequently, the potential for exposure of people or structures to a significant risk of loss, injury, or death involving wildland fires is less than significant, and no mitigation is required.

Impact HAZ-8a-2: Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands—program Alternative 2: 450 WM (less than significant)

The program area consists primarily of grassland and grazing land. Dry climate conditions create circumstances rich with fuels, although active grazing, agricultural irrigation, and landscape irrigation provide some fuel reduction. Human activities are the primary reason wildfires start, although lightning strikes do occasionally occur. As discussed above, the most likely source of an ignition from the project would be hardware and/or conductor failures of power collection lines, dropping of collection lines, turbine malfunction or mechanical failure, and avian-related incidents.

Program Alternative 2 would entail the removal of existing turbines and installation of new turbines. Decommissioning and removing existing wind turbines would require additional work crews, temporarily increasing the number of vehicles in the individual project areas. Climate conditions together with the potential for vehicle-related ignitions make this a concern, especially during the summer months.

The potential for wildland fires already exists in the program area due to the presence of the wind energy facilities. Because CAL FIRE and ACFD already provide fire protection services to the program area, the fire protection facilities and infrastructure required to protect the existing facilities are in place. The program would not alter the Altamont Pass Wind Farms Fire Requirements as described in Exhibit C of the 2005 CUPs. Consequently, the potential for exposure of people or structures to a significant risk of loss, injury, or death involving wildland fires is less than significant, and no mitigation is required.

Impact HAZ-8b: Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands—Golden Hills Project (less than significant)

The project area consists primarily of grassland and grazing land. Dry climate conditions create circumstances rich with fuels, although active grazing, agricultural irrigation, and landscape irrigation provide some fuel reduction. Human activities are the primary reason wildfires start, although lightning strikes do occasionally occur. As discussed above, the most likely source of an ignition from the project would be hardware and/or conductor failures of power collection lines, dropping of collection lines, turbine malfunction or mechanical failure, and avian-related incidents.

The proposed project would entail the removal of existing turbines and installation of new turbines. Decommissioning and removing existing wind turbines would require additional work crews, temporarily increasing the number of vehicles in the project area. Climate conditions together with the potential for vehicle-related ignitions make this a concern, especially during the summer months.

The potential for wildland fires already exists in the project area due to the presence of the wind energy facilities. Because CAL FIRE and ACFD already provide fire protection services to the project area, the fire protection facilities and infrastructure required to protect the existing facilities are in place. The proposed project would not alter the Altamont Pass Wind Farms Fire Requirements as described in Exhibit C of the 2005 CUPs. Consequently, the potential for exposure of people or structures to a significant risk of loss, injury, or death involving wildland fires is less than significant, and no mitigation is required.

Impact HAZ-8c: Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands—Patterson Pass Project (less than significant)

The project area consists primarily of grassland and grazing land. Dry climate conditions create circumstances rich with fuels, although active grazing, agricultural irrigation, and landscape irrigation provide some fuel reduction. Human activities are the primary reason wildfires start, although lightning strikes do occasionally occur. As discussed above, the most likely source of an ignition from the project would be hardware and/or conductor failures of power collection lines, dropping of collection lines, turbine malfunction or mechanical failure, and avian-related incidents.

The proposed project would entail the removal of existing turbines and installation of new turbines. Decommissioning and removing existing wind turbines would require additional work crews, temporarily increasing the number of vehicles in the project area. Climate conditions together with the potential for vehicle-related ignitions make this a concern, especially during the summer months.

The potential for wildland fires already exists in the project area due to the presence of the wind energy facilities. Because CAL FIRE and ACFD already provide fire protection services to the project area, the fire protection facilities and infrastructure required to protect the existing facilities are in place. The proposed project would not alter the Altamont Pass Wind Farms Fire Requirements as described in Exhibit C of the 2005 CUPs. Consequently, the potential for exposure of people or structures to a significant risk of loss, injury, or death involving wildland fires is less than significant, and no mitigation is required.

Impact HAZ-9a-1: During normal operation, the effects of bending and stress on rotor blades over time could lead to blade failure and become a potential blade throw hazard—program Alternative 1: 417 MW (less than significant)

Generally, setback requirements for wind turbines are based on the turbine height. According to a report prepared for CEC (Larwood and van Dam 2006), several studies have been conducted in the last 25 years using various methods to determine the frequency of blade throw. Definitive data, however, are limited—particularly for the current generation of wind turbines in terms of blade throw distances—because typical failure reports do not differentiate between blade throw and other types of failures.

There is no ordinance dictating setback conditions in Alameda County; rather, setbacks are determined on a project-by-project basis in accordance with the standard conditions of approval for a CUP. The *Alameda County Wind Farm Standard Conditions* requires a minimum setback of three times the total height of the turbine (to top of blade), or four times the total height of the turbine if the ground elevation is two or more times the turbine height above County roads, residences, property boundaries, transmission facilities, and railroads. Setback requirements from I-580 are more stringent, requiring a setback of six times the total height of the turbine, or eight times the total height of the turbine if the ground elevation of the turbine is two or more times the height of the turbine above the traveled way of I-580, but in no case less than 152 meters.

Persons and facilities within the blade throw hazard zone could be at risk of damage, injury, or death if struck by a falling blade. People potentially within the hazard zone include the residences within the program area, recreationalists in and around Bethany Reservoir, and motorists travelling along I-580 and county roads. The important infrastructure in and adjacent to the program area potentially susceptible to damage from blade throw includes PG&E transmission lines and windfarm substations.

The blade throw hazard distance for the existing wind energy facilities indicates that approximately seven existing wind turbines are closer than three times the turbine height to county roads and three residences. These inconsistencies may be because the turbines are located on varied topography and the distance measured along the ground surface is through space or "as the crow flies." Table 3.8-1 shows the distance of the closest wind turbines to facilities where people are most often present in the APWRA. Elevation ranges are not considered in these numbers.

Table 3.8-1. Facilities within Specified Setback Distances from Existing Turbines

Facility Type	Distance from Closest Wind Turbine (meters [feet])
Interstate 580	150 (492)
Dyer Road[a]	173 (568)
Altamont Pass Road[a]	95 (312)
Patterson Pass Road[a]	116 (381)
Vasco Road[a]	404 (1,325)
Residence 1[a]	163 (535)
Residence 3[a]	245 (804) (Golden Hills project area)
Residence 25[a]	213 (699 (Golden Hills project area)
Bethany Reservoir	674 (2,211) (Golden Hills project area)

[a] Closer than three times the turbine height to sensitive receptor.

As described in Chapter 2, *Program Description*, the turbine height for fourth-generation turbines proposed for repowering ranges from 121 to 153 meters. Using the setback requirement above, the minimum safe distance in the context of blade throw hazard zone is, conservatively, 459 meters (1,506 feet) for the taller wind turbines and 918 meters (3,012 feet) from I-580. If existing turbines are replaced with fourth-generation turbines in the same locations, the blade throw hazard zone could possibly encroach into sensitive areas of human occupancy. However, siting of wind turbines would comply with the Standard Conditions, ensuring that no new wind turbines would be sited within the blade throw hazard distance. Consequently—in relation to the seven turbines mentioned above—the program would help reduce impacts relating to blade throw.

Blade throw risks are also reduced as a result of new technologies and engineering design developed over the past decades. Most commercially available turbines, including those proposed for the program, are equipped with safety and engineering features to reduce the risk of blade failure and are designed to ensure safe operation under normal conditions. Fourth-generation rotors include blade pitch controls that regulate the angle of the rotor blade into the wind, and redundant brake mechanisms that can control speed and shutdown or slowdown in response to excessive wind speed.

Repowering would reduce the total number of wind turbines in the program area because of the vastly greater nameplate capacity of fourth-generation turbines. The reduced number of turbines would also reduce the potential for wind turbine-related hazards.

In most of the program area, due largely to the setback standards, any potential for blade throw would occur well within windfarm boundaries—not in areas accessible to the public. Individual windfarm companies strictly control access to the existing wind energy facilities, and overall site access is limited to persons approved for entry by the windfarm operators or landowners. This strict control of public access would further reduce the risk of potential blade strike in the program area. Accordingly, the potential for exposure of people or structures to a significant risk of loss, injury, or death involving blade throw is less than significant, and no mitigation is required.

Impact HAZ-9a-2: During normal operation, the effects of bending and stress on rotor blades over time could lead to blade failure and become a potential blade throw hazard—program Alternative 2: 450 MW (less than significant)

Generally, setback requirements for wind turbines are based on the turbine height. According to a report prepared for CEC (Larwood and van Dam 2006), several studies have been conducted in the last 25 years using various methods to determine the frequency of blade throw. Definitive data, however, are limited—particularly for the current generation of wind turbines in terms of blade throw distances—because typical failure reports do not differentiate between blade throw and other types of failures.

There is no ordinance dictating setback conditions in Alameda County; rather, setbacks are determined on a project-by-project basis in accordance with the standard conditions of approval for a CUP. The *Alameda County Wind Farm Standard Conditions* requires a minimum setback of three times the total height of the turbine (to top of blade), or four times the total height of the turbine if the ground elevation is two or more times the turbine height above County roads, residences, property boundaries, transmission facilities, and railroads. Setback requirements from I-580 are more stringent, requiring a setback of six times the total height of the turbine), or eight times the total height of the turbine if the ground elevation of the turbine is two or more times the height of the turbine above the traveled way of I-580, but in no case less than 152 meters.

Persons and facilities within the blade throw hazard zone could be at risk of damage, injury, or death if struck by a falling blade. People potentially within the hazard zone include the residences within the program area, recreationalists in and around Bethany Reservoir, and motorists travelling along I-580 and county roads. The important infrastructure in and adjacent to the program area potentially susceptible to damage from blade throw includes PG&E transmission lines and windfarm substations.

The blade throw hazard distance for the existing wind energy facilities indicates that approximately seven existing wind turbines are closer than three times the turbine height to county roads and three residences. These inconsistencies may be because the turbines are located on varied topography and the distance measured along the ground surface is through space or "as the crow flies." Table 3.8-1 shows the distance of the closest wind turbines to facilities where people are most often present in the APWRA. Elevation ranges are not considered in these numbers.

As described in Chapter 2, *Program Description*, the turbine height for fourth-generation turbines proposed for repowering ranges from 121 to 153 meters. Using the setback requirement above, the minimum safe distance in the context of blade throw hazard zone is, conservatively, 459 meters for the taller wind turbines—918 meters from I-580. If existing turbines are replaced with fourth-generation turbines in the same locations, the blade throw hazard zone could possibly encroach into sensitive areas of human occupancy. However, siting of wind turbines would comply with the Standard Conditions, ensuring that no new wind turbines would be sited within the blade throw hazard distance. Consequently—in relation to the seven turbines mentioned above—the program would help reduce impacts relating to blade throw.

Blade throw risks are also reduced as a result of new technologies and engineering design developed over the past decades. Most commercially available turbines, including those proposed for the program, are equipped with safety and engineering features to reduce the risk of blade failure and are designed to ensure safe operation under normal conditions. Fourth-generation rotors include blade pitch controls that regulate the angle of the rotor blade into the wind, and redundant brake mechanisms that can control speed and shutdown or slowdown in response to excessive wind speed.

Repowering would reduce the total number of wind turbines in the program area because of the vastly greater nameplate capacity of fourth-generation turbines. The reduced number of turbines would also reduce the potential for wind turbine–related hazards.

In most of the program area, any potential for blade throw would occur well within windfarm boundaries—not in areas accessible to the public. Individual windfarm companies strictly control access to the existing wind energy facilities, and overall site access is limited to persons approved for entry by the windfarm operators or landowners. This strict control of public access would further reduce the risk of potential blade strike in the program area. Accordingly, the potential for exposure of people or structures to a significant risk of loss, injury, or death involving blade throw is less than significant, and no mitigation is required.

Impact HAZ-9b: During normal operation, the effects of bending and stress on rotor blades over time could lead to blade failure and become a potential blade throw hazard—Golden Hills Project (less than significant)

There is no ordinance dictating setback conditions in Alameda County; rather, setbacks are determined on a project-by-project basis in accordance with the standard conditions of approval for a CUP. The *Alameda County Wind Farm Standard Conditions* requires a minimum setback of three times the total height of the turbine (to top of blade), or four times the total height of the turbine if the ground elevation is two or more times the turbine height above County roads, residences, property boundaries, transmission facilities, and railroads. Setback requirements from I-580 are more stringent, requiring a setback of six times the total height of the turbine), or eight times the total height of the turbine if the ground elevation of the turbine is two or more times the height of the turbine above the traveled way of I-580, but in no case less than 152 meters.

Persons and facilities within the blade throw hazard zone could be at risk of damage, injury, or death if struck by a falling blade. People potentially within the hazard zone include the residences in the project area and motorists travelling along I-580 and county roads. The important infrastructure in and adjacent to the project area potentially susceptible to damage from blade throw includes PG&E transmission lines and windfarm substations.

NextEra strictly controls access to the existing wind energy facilities, and overall site access is limited to persons approved for entry. This strict control of public access would further reduce the risk of potential blade strike in the project area. Residences in the project area are more than 424 meters (1,391 feet) from the nearest proposed turbine. Moreover, compliance with the minimum setbacks established in the *Alameda County Wind Farm Standard Conditions* would ensure that no turbine is placed within the specified distance from any residence or other identified feature. Accordingly, the potential for exposure of people or structures to a significant risk of loss, injury, or death involving blade throw is less than significant, and no mitigation is required.

Impact HAZ-9c: During normal operation, the effects of bending and stress on rotor blades over time could lead to blade failure and become a potential blade throw hazard—Patterson pass Project (less than significant)

There is no ordinance dictating setback conditions in Alameda County; rather, setbacks are determined on a project-by-project basis in accordance with the standard conditions of approval for a CUP. The *Alameda County Wind Farm Standard Conditions* requires a minimum setback of three times the total height of the turbine (to top of blade), or four times the total height of the turbine if the ground elevation is two or more times the turbine height above County roads, residences, property boundaries, transmission facilities, and railroads. Setback requirements from I-580 are more stringent, requiring a setback of six times the total height of the turbine), or eight times the total height of the turbine if the ground elevation of the turbine is two or more times the height of the turbine above the traveled way of I-580, but in no case less than 152 meters.

Persons and facilities within the blade throw hazard zone could be at risk of damage, injury, or death if struck by a falling blade. People potentially within the hazard zone include motorists travelling along county roads; there are no residences within setback distances in the project area. The important infrastructure in and adjacent to the project area potentially susceptible to damage from blade throw includes PG&E transmission lines and windfarm substations.

EDF RE strictly controls access to the existing wind energy facilities, and overall site access is limited to persons approved for entry. This strict control of public access would further reduce the risk of potential blade strike in the project area. Accordingly, the potential for exposure of people or structures to a significant risk of loss, injury, or death involving blade throw is less than significant, and no mitigation is required.

3.8.3 References Cited

Printed References

Alameda County. 1998. *Draft Environmental Impact Report—Repowering a Portion of the Altamont Pass Wind Resource Area*. August. State Clearinghouse #98022024. Hayward, CA: Alameda County Community Development Agency.

———. 2013. *Safety Element of the Alameda County General Plan.* Adopted January 8, 2013. Available: http://acgov.org/cda/planning/generalplans/index.htm.

Alameda County Fire Department. 2012. *Fire Stations and Facilities-ACFD Station 20*. Available: <http://www.acgov.org/fire/about/station20.htm>. Accessed: April 22, 2013.

———. n.d.(a) *Company Officer Reference Guide—Station 20*. Division of Training, Alameda County, California.

———. n.d.(b) *Company Officer Reference Guide – Station 08*. Division of Training, Alameda County, California.

California Department of Forestry and Fire Protection 2007. *Fire Hazard Severity Zone*. Map Adopted November 2007. Available: http://www.fire.ca.gov/fire_prevention/fhsz_maps_alameda.php. Accessed: April 22, 2013.

Contra Costa County. 2000. *Contra Costa County Airport Land Use Compatibility Plan*. December.

Larwood, S., and C. P. van Dam (California Wind Energy Collaborative). 2006. *Permitting Setback Requirements for Wind Turbines in California*. California Energy Commission, PIER Renewable Energy Technologies. CEC-500-2005-184.

Personal Communications

Berdan, Chuck. Dispatch Manager of the Alameda County Regional Emergency Communications Center. Alameda County Fire Department, California. May 15, 2013—telephone call with Tina Sorvari, ICF International.

Martin, Mike. Battalion Chief of CAL FIRE Battalion 4, Santa Clara Unit. Cal Fire, California. May 23, 2013—telephone call with Tina Sorvari, ICF International.

3.9 Hydrology and Water Quality

This section describes the environmental and regulatory setting for hydrology and water quality. It also describes impacts on hydrology and water quality that would result from implementation of the program and the two individual projects and mitigation for significant impacts where feasible and appropriate.

3.9.1 Existing Conditions

Regulatory Setting

Federal

Clean Water Act

The following are potentially applicable sections of the Clean Water Act (CWA) (33 USC 1251–13176).

Section 303 and 305—Total Maximum Daily Load Program

The State of California adopts water quality standards to protect beneficial uses of state waters as required by CWA 303 Total Maximum Daily Load Program and the State's Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act). CWA 303(d) established the total maximum daily load (TMDL) process to guide the application of state water quality standards (see the discussion of state water quality standards below). To identify candidate water bodies for TMDL analysis, a list of water-quality–limited streams is generated. Such streams are considered to be impaired by the presence of pollutants, including sediments, and to have no additional assimilative capacity for these pollutants.

In addition to the impaired waterbody list required by CWA Section 303(d), CWA Section 305(b) requires states to develop a report assessing statewide surface water quality. Both CWA requirements are being addressed through the development of a 303(d)/305(b) Integrated Report, which will address both an update to the 303(d) list and a 305(b) assessment of statewide water quality. The State Water Resources Control Board (State Water Board) developed a statewide 2010 California Integrated Report based on the Integrated Reports from each of the nine Regional Water Quality Control Boards (Regional Water Boards). The 2010 California Integrated Report was approved by the State Water Board at a public hearing on August 4, 2010, and the report was submitted to the EPA for final approval. Although updates to the 303(d) list must be finalized by the EPA before becoming effective, this updated 303(d) list will be used for this analysis in order to have the most up-to-date information available.

Section 401—Water Quality Certification

CWA Section 401 requires that an applicant pursuing a federal permit to conduct any activity that may result in a discharge of a pollutant obtain a water quality certification (or waiver). Water quality certifications are issued by the Regional Water Boards in California. (The San Francisco Bay Regional Water Board is responsible for the Bay Area and the Central Valley Water Board is responsible for the Central Valley.) Because the program area contains watersheds draining to the

Central Valley as well as to San Francisco Bay, it is under the jurisdiction of both the Central Valley Water Board and the San Francisco Bay Regional Water Board. Under CWA, the state (as implemented by the relevant Regional Water Board) must issue or waive CWA Section 401 water quality certification for a project to be permitted under CWA Section 404. Water quality certification requires the evaluation of water quality considerations associated with dredging or the placement of fill materials into waters of the United States. Construction of the proposed project would require CWA 401 certification for the project if CWA Section 404 requirements are triggered.

Section 402—National Pollutant Discharge Elimination System Program

The 1972 amendments to the federal Water Pollution Control Act established the NPDES permit program to control discharges of pollutants from point sources (CWA Section 402). The 1987 amendments to the CWA created a new section of CWA devoted to stormwater permitting (CWA 402[p]). EPA has granted the State of California primacy in administering and enforcing the provisions of CWA and the NPDES permit program. The NPDES permit program is the primary federal program that regulates point-source and nonpoint-source discharges to waters of the United States.

The State Water Board issues both general and individual permits for certain activities. Although implemented at the state and local level, relevant general and individual NPDES permits are discussed below.

Construction Activities

Dischargers whose projects disturb 1 or more acres of soil or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres are required to file a notice of intent (NOI) to obtain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ) (Construction General Permit). Construction activities subject to this permit include clearing, grading, and disturbances to the ground such as stockpiling or excavation, but do not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

The Construction General Permit requires the preparation and implementation of a stormwater pollution prevention plan (SWPPP), which must be completed before construction begins. The SWPPP should contain a site map that shows the construction site perimeter; existing and proposed buildings, lots, roadways, and stormwater collection and discharge points; general topography both before and after construction; and drainage patterns across the project site. The SWPPP must list best management practices (BMPs) the discharger will use to manage stormwater runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a monitoring program for pollutants that are not visible to be implemented if there is a failure of BMPs; and a pH and turbidity monitoring program if the site discharges to a water body listed on the 303(d) list for sediment. Section A of the Construction General Permit describes the elements that must be contained in a SWPPP.

Postconstruction Stormwater Management

The individual NPDES permit (under Provision C.3, San Francisco Bay Regional Water Board areas only) requires that permanent water quality control devices treat all stormwater to the maximum extent practicable and result in no additional runoff. Runoff from new impervious surfaces of 10,000 square feet or more must be sized according to the volume or rate criteria identified in the permit. After treatment devices are installed, owners must enter into a maintenance agreement with the County to ensure the treatment devices are maintained, inspected, and reported on annually. Low impact development (LID) facilities are required for the project unless the project is eligible for LID reduction credit. LID includes rainwater harvesting, infiltration and bio treatment.

Section 404—Permits for Fill Placement in Waters and Wetlands

CWA Section 404 regulates the discharge of dredged and fill materials into "waters of the United States," which include oceans, bays, rivers, streams, lakes, ponds, and wetlands. Project proponents must obtain a permit from USACE for all discharges of dredged or fill material into waters of the United States before proceeding with a proposed activity. Before any actions that may affect surface waters are implemented, a delineation of jurisdictional waters of the United States must be completed, following USACE protocols, to determine whether the study area contains wetlands or other waters of the United States that qualify for CWA protection. These areas include the following.

- Sections within the ordinary high water mark (OHWM) of a stream, including non-perennial streams with a defined bed and bank and any stream channel that conveys natural runoff, even if it has been realigned.
- Seasonal and perennial wetlands, including coastal wetlands.

Section 404 permits may be issued for only the least environmentally damaging practical alternative (i.e., authorization of a proposed discharge is prohibited if there is a practical alternative that would have fewer significant effects and lacks other significant consequences). Section 404 might apply if construction would occur within waters of the United States.

State

Porter-Cologne Water Quality Control Act of 1969

The Porter-Cologne Act established the State Water Board and divided the state into nine regional basins, each with a Regional Water Board. The State Water Board is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies, while the regional boards are responsible for developing and enforcing water quality objectives and implementation plans. As mentioned, the San Francisco Bay Regional Water Board is responsible for the Bay Area region, and the Central Valley Water Board is responsible for the Central Valley area of the program which is the majority of the program area.

The Porter-Cologne Act authorizes the State Water Board to enact state policies regarding water quality in accordance with CWA 303. In addition, the act authorizes the State Water Board to issue waste discharge requirements (WDRs) for projects that would discharge to state waters. The Porter-Cologne Act requires that the State Water Board or the Regional Water Board adopt water quality control plans (basin plans) for the protection of water quality. A basin plan must perform the following functions.

- Identify beneficial uses of water to be protected.
- Establish water quality objectives for the reasonable protection of the beneficial uses.
- Establish a program of implementation for achieving the water quality objectives.

Basin plans also provide the technical basis for determining WDRs, taking enforcement actions, and evaluating clean water grant proposals. Basin plans are updated and reviewed every 3 years in accordance with Article 3 of Porter-Cologne Act and CWA 303(c) (San Francisco Bay Regional Water Quality Control Board 2011; Central Valley Regional Water Quality Control Board 2011).

California Regional Water Quality Control Board, San Francisco Bay Region and Central Valley Region—Basin Plans

Water quality in streams and aquifers of the region is guided and regulated by the San Francisco Bay Regional Water Quality Control Board Basin Plan (San Francisco Bay Regional Water Quality Control Board 2011). State policy for water quality control is directed at achieving the highest water quality consistent with the maximum benefit to the people of the state. To develop water quality standards consistent with the uses of a water body, the Regional Water Boards classify historical, present, and potential future beneficial uses for San Francisco Bay Area/Central Valley waters as part of the basin plans.

In general, beneficial uses can be classified to include municipal supply, cold freshwater habitat, groundwater recharge, fish migration, water contact recreation, noncontact water recreation, fish spawning, warm freshwater habitat, rare species habitat, and wildlife habitat (San Francisco Bay Regional Water Quality Control Board 2011, Central Valley Regional Water Quality Control Board 2011).

Local

Alameda County Stormwater Management Plan

The Department of Environmental Health developed a formal agreement with Public Works Agency to implement the industrial and commercial component of the Alameda County Clean Water Program's (ACCWP) Stormwater Management Plan for unincorporated Alameda County. The program includes inspection of facilities for compliance with the clean water regulations, provide outreach and education of best management practices to business owners, follow up inspection for enforcement action, and creation and maintenance of a database of businesses in Alameda County unincorporated area for the Clean Water Program. This program also addresses items addressed above under Construction Activities.

East County Area Plan

Relevant components of the ECAP to meet Water Quality goals for surface and groundwater are listed below (Alameda County 2000). These policies and implementation programs address similar components as in the Alameda County General Plan.

Policies

Policy 306: The County shall protect surface and groundwater resources by:

- preserving areas with prime percolation capabilities and minimizing placement of potential sources of pollution in such areas;
- minimizing sedimentation and erosion through control of grading, quarrying, cutting of trees, removal of vegetation, placement of roads and bridges, use of off-road vehicles, and animal-related disturbance of the soil;
- not allowing the development of septic systems, automobile dismantlers, waste disposal

- facilities, industries utilizing toxic chemicals, and other potentially polluting substances in creekside, reservoir, or high groundwater table areas when polluting substances could come in contact with flood waters, permanently or seasonally high groundwaters, flowing stream or creek waters, or reservoir waters; and,
- avoiding establishment of excessive concentrations of septic systems over large land areas.

Implementation Programs

Program 108: The County shall implement all federal, state and locally imposed statutes, regulations, and orders that apply to storm water quality. Examples of these include, but are not limited to:

- National Pollutant Discharge Elimination System (NPDES) stormwater permit issued by the California Regional Water Quality Control Board (RWQCB) to the Alameda County Urban Runoff Clean Water Program and amendments thereto;
- State of California NPDES General Permit for Storm Water Discharges (General Industrial Permit, General Construction Permit) and amendments thereto;
- Coastal Zone Management Act;
- Coastal Zone Act Reauthorization Amendments;
- Water Quality Control Plan, San Francisco Bay Basin Region (Basin Plan) and amendments thereto; and
- Letters issued by the RWQCB under the California Porter-Cologne Water Quality Act.

Program 109: The County shall endeavor to minimize herbicide use by public agencies by reviewing existing use and applying integrated pest management principles, such as mowing and mulching, in addition to eliminating or scaling back the need for vegetation control in the design phase of a project.

Program 110: The County shall conform with Alameda County Flood Control and Water Conservation District's (Zone 7) Wastewater Management Plan and the Regional Water Quality Control Board's San Francisco Bay Basin Plan.

Environmental Setting

Surface Water and Drainage

The program area is southwest of the San Joaquin–Sacramento Delta (Delta) in unincorporated northern Alameda County. Figure 3.9-1 shows the drainages in and around the program area. The preponderance of the program area—comprising (from north to south) the Brushy Creek, Clifton Court Forebay, Mountain House Creek, Lower Old River, Lower Corral Hollow Creek, and Upper Corral Hollow Creek watersheds—flow generally east toward the Central Valley. A narrower strip along the western portion of the program area—comprising the Upper Arroyo Las Positas and Arroyo Seco watersheds—drain west toward the San Francisco Bay region.

Additionally, some runoff enters a drainage ditch that borders the program area on the east, and some enters a canal that bisects the southern portion of the program area; both features drain to Mountain House Creek, a tributary of Old River.

According to the most recent CWA Section 303(d) List (2010), Mountain House Creek is impaired for chloride and salinity, and Old River is impaired for chlorpyrifos, electrical conductivity, total dissolved solids (TDS) and low dissolved oxygen (State Water Resources Control Board 2010).

Groundwater Resources

The program area is in the Tracy Subbasin (Basin Number 5-22.15), according to the California Department of Water Resources (DWR) Groundwater Bulletin 118. There are no published groundwater storage amounts for the entire basin; however, estimated groundwater storage capacity is approximately 4,040,000 acre-feet (af) (California Department of Water Resources 2006). Review of hydrographs for the Tracy subbasin indicates that, except for some seasonal variation resulting from recharge and pumping, the majority of water levels in wells have remained relatively stable over at least the last 10 years (California Department of Water Resources 2006).

Groundwater quality in the subbasin is characterized by a sodium water type and the southern part of the subbasin is characterized by calcium-sodium water type. The northern part of the subbasin is also characterized by a wide range of anionic water types including: bicarbonate; chloride; and mixed bicarbonate-chloride types. TDS concentrations in well water samples range from 50 to 3,520 milligrams per liter (mg/L), with an average of 463 mg/L. Areas of poor water quality exist throughout the subbasin. Elevated levels of chloride occur in several areas along the western side of the subbasin along with areas of elevated boron concentrations (California Department of Water Resources 2006).

Flooding

The program site is not within a 100-year flood hazard area (see Figure 3.9-1), as identified on a Flood Insurance Rate Map (FIRM) delineated by the Federal Emergency Management Agency (FEMA).

3.9.2 Environmental Impacts

This section describes the environmental impacts relating to hydrology, water quality and groundwater resources for the proposed program and two individual projects. It describes the methods used to determine the effects of the program and projects and lists the thresholds used to conclude whether an impact would be significant. The impacts that would result from implementation of the program and projects, findings with or without mitigation, and applicable mitigation measures are presented.

Methods for Analysis

This evaluation of hydrology, water quality, and groundwater resources is based on professional standards and information cited throughout the section.

The key impacts were identified and evaluated based on the environmental characteristics of the program/project area and the magnitude, intensity, and duration of activities related to the construction and operation of the proposed program and two individual projects.

Determination of Significance

In accordance with Appendix G of the State CEQA Guidelines, program Alternative 1, program Alternative 2, the Golden Hills project, or the Patterson Pass project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Violate any water quality standards or waste discharge requirements.

- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted).
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite.
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Otherwise substantially degrade water quality.
- Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures that would impede or redirect floodflows.
- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Contribute to inundation by seiche, tsunami, or mudflow.

Impacts and Mitigation Measures

Impact WQ-1a-1: Violate any water quality standards or waste discharge requirements—program Alternative 1: 417 MW (less than significant with mitigation)

Construction-related earth-disturbing activities associated with program Alternative 1 would introduce the potential for increased erosion and sedimentation, with subsequent effects on drainage and water quality. During construction, trenching and other construction activities create areas of bare soil that can be exposed to erosive forces for long periods of time. Bare soils are much more likely to erode than vegetated areas because of the lack of dispersion, infiltration, and retention properties created by covering vegetation. Construction activities involving soil disturbance, excavation, cutting/filling, stockpiling, and grading could result in increased erosion and sedimentation to surface waters, if proper BMPs are not used.

While existing activities at the program area may already result in the release of sediment, the extent of earth disturbance resulting from construction of the project is anticipated to result in a new and intensified potential for the release of sediments due to staging areas and turbine construction sites. If precautions are not taken to contain or capture sedimentation, earth-disturbing construction activities could result in substantial sedimentation in stormwater runoff and result in a significant impact on existing surface water quality.

Implementation of Mitigation Measure WQ-1 would minimize the potential erosion- and sedimentation-related water quality impacts and would reduce this impact to a less-than-significant level.

Mitigation Measure WQ-1: Comply with NPDES requirements

Project contractors will obtain coverage under the General Construction Permit before the onset of any construction activities, because all projects will entail disturbance of 1 acre or more. A SWPPP will be developed by a qualified engineer or erosion control specialist in accordance with the appropriate Board's requirements for NPDES compliance and implemented prior to the issuance of any grading permit before construction. The SWPPP will be kept onsite during construction activity and will be made available upon request to representatives of the Regional Water Boards.

Compliance and coverage with the *Storm Water Management Program* and General Construction Permit will require controls of pollutant discharges that utilize BMPs and technology to reduce erosion and sediments to meet water quality standards. BMPs may consist of a wide variety of measures taken to reduce pollutants in stormwater and other nonpoint-source runoff. Measures range from source control, such as reduced surface disturbance, to the treatment of polluted runoff, such as detention basins.

BMPs to be implemented as part of the *Storm Water Management Program* and General Construction Permit (and SWPPP) may include the following practices.

- Temporary erosion control measures (such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover) will be employed to control erosion from disturbed areas.
- Use a dry detention basin (which is typically dry except after a major rainstorm, when it will temporarily fill with stormwater), designed to decrease runoff during storm events, prevent flooding, and allow for off-peak discharge. Basin features will include maintenance schedules for the periodic removal of sediments, excessive vegetation, and debris that may clog basin inlets and outlets.
- Cover or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more) that could contribute sediment to waterways.
- Enclose and cover exposed stockpiles of dirt or other loose, granular construction materials that could contribute sediment to waterways.
- Ensure that no earth or organic material will be deposited or placed where it may be directly carried into a stream, marsh, slough, lagoon, or body of standing water.
- Prohibit the following types of materials from being rinsed or washed into the streets, shoulder areas, or gutters: concrete, solvents and adhesives, thinners, paints, fuels, sawdust, dirt, gasoline, asphalt and concrete saw slurry, and heavily chlorinated water.
- Ensure that grass or other vegetative cover will be established on the construction site as soon as possible after disturbance.

The contractor will select a combination of BMPs (consistent with Section A of the Construction General Permit) that is expected to minimize runoff and remove contaminants from stormwater discharges. The final selection of BMPs will be subject to approval by the San Francisco Bay Regional Water Board and the Central Valley Water Board.

The contractor will verify that an NOI has been filed with the State Water Board and that a SWPPP has been developed before allowing construction to begin. The contractor will perform inspections of the construction area, to verify that the BMPs specified in the SWPPP are properly implemented and maintained. The contractor will notify the appropriate Regional Water Board immediately if there is a noncompliance issue and will require compliance. If necessary, the contractor or their agent will require that additional BMPs be designed and implemented if those originally constructed do not achieve the identified performance standard.

Impact WQ-1a-2: Violate any water quality standards or waste discharge requirements—program Alternative 2: 450 MW (less than significant with mitigation)

Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Construction-related earth-disturbing activities associated with program Alternative 2 would introduce the potential for increased erosion and sedimentation, with subsequent effects on drainage and water quality. During construction, trenching and other construction activities create areas of bare soil that can be exposed to erosive forces for long periods of time. Bare soils are much more likely to erode than vegetated areas because of the lack of dispersion, infiltration, and retention properties created by covering vegetation. Construction activities involving soil disturbance, excavation, cutting/filling, stockpiling, and grading could result in increased erosion and sedimentation to surface waters, if proper BMPs are not used.

While existing activities at the program area may already result in the release of sediment, the extent of earth disturbance resulting from construction of the project is anticipated to result in a new and intensified potential for the release of sediments due to staging areas and turbine construction sites. If precautions are not taken to contain or capture sedimentation, earth-disturbing construction activities could result in substantial sedimentation in stormwater runoff and result in a significant impact on existing surface water quality.

Implementation of Mitigation Measure WQ-1 would minimize the potential erosion- and sedimentation-related water quality impacts and would reduce this impact to a less-than-significant level.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-1b: Violate any water quality standards or waste discharge requirements—Golden Hills Project (less than significant with mitigation)

As disclosed in the program-level analysis, construction of the Golden Hills Project would disturb soil and have the potential to affect water quality. As stated in Chapter 2, *Project Description*, the Golden Hills Project would be required to obtain coverage under the state's NPDES Construction General Permit (see additional discussion above in Mitigation Measure WQ-1).

Implementation of Mitigation Measure WQ-1 would minimize the potential erosion- and sedimentation-related water quality impacts and would reduce this impact to a less-than-significant level.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-1c: Violate any water quality standards or waste discharge requirements—Patterson Pass Project (less than significant with mitigation)

As disclosed in the program-level analysis, construction of the Patterson Pass Project would disturb soil and have the potential to affect water quality. As stated in Chapter 2, *Project Description*, the Patterson Pass Project would be required to gain coverage under the state's NPDES Construction General Permit (see additional discussion above in Mitigation Measure WQ-1).

Implementation of Mitigation Measure WQ-1 would minimize the potential erosion- and sedimentation-related water quality impacts and would reduce this impact to a less-than-significant level.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-2a-1: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)—program Alternative 1: 417 MW (less than significant)

Construction of the proposed program involves relatively small footprints that would not result in blocking groundwater infiltration to a point that would deplete groundwater supplies or interfere substantially with any nearby agricultural wells. In addition, project construction would not involve a substantial use of water with the exception of normal BMPs such as road and site dust control (this water would be trucked to the site). Operational water consumption would also be minimal. Therefore, this impact would be less than significant and no mitigation is required.

Impact WQ-2a-2: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)—program Alternative 2: 450 MW (less than significant)

Construction of the proposed program involves relatively small footprints that would not result in blocking groundwater infiltration to a point that would deplete groundwater supplies or interfere substantially with any nearby agricultural wells. In addition, project construction would not involve a substantial use of water with the exception of normal BMPs such as road and site dust control (this water would be trucked to the site). Operational water consumption would also be minimal. Therefore, this impact would be less than significant and no mitigation is required.

Impact WQ-2b: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)—Golden Hills Project (less than significant)

As disclosed in the program-level analysis, construction of the Golden Hills Project would not block groundwater infiltration to a point that would cause depletion of groundwater. All water for construction purposes would be trucked in and use of water for operations would be minimal. Therefore, this impact would be less than significant and no mitigation is required.

Impact WQ-2c: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)—Patterson Pass Project (less than significant)

As disclosed in the program-level analysis, construction of the Patterson Pass Project would not block groundwater infiltration to a point that would cause depletion of groundwater. All water for construction purposes would be trucked in and use of water for operations would be minimal. Therefore, this impact would be less than significant and no mitigation is required.

Impact WQ-3a-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite—program Alternative 1: 417 MW (less than significant with mitigation)

Program Alternative 1 would not construct any turbines within existing drainage areas and the program footprints would be designed to not cause any downstream erosion during the storm season. In addition, the proposed program would be required to adhere to the NPDES Construction General Permit. Therefore, implementation of Mitigation Measure WQ-1 would ensure that program-related stormwater runoff would not result in substantial erosion or downstream siltation.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-3a-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite—program Alternative 2: 450 MW (less than significant with mitigation)

Direct effects under Alternative 2 would be similar to those under Alternative 1, except the overall area of disturbance would be larger because the increased number of turbines and associated infrastructure would entail an estimated 8% increase in total disturbance area. Program Alternative 2 would not construct any turbines within existing drainage areas and the program footprints would be designed to not cause any downstream erosion during the storm season. In addition, the proposed program would be required to adhere to the NPDES Construction General Permit. Therefore, implementation of Mitigation Measure WQ-1 would ensure that program-related stormwater runoff would not result in substantial erosion or downstream siltation.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-3b: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite—Golden Hills Project (less than significant with mitigation)

As disclosed in the program-level analysis, the Golden Hills Project would not construct any turbines within existing drainage areas and the project footprints would be designed to not cause any downstream erosion during the storm season. In addition, the proposed project would be required to adhere to the NPDES Construction General Permit. Therefore, implementation of Mitigation

Measure WQ-1 would ensure that project-related stormwater runoff would not result in substantial erosion or downstream siltation.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-3c: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite—Patterson Pass Project (less than significant with mitigation)

As disclosed in the program-level analysis, the Patterson Pass Project would not construct any turbines within existing drainage areas and the project footprints would be designed to not cause any downstream erosion during the storm season. In addition, the proposed project would be required to adhere to the NPDES Construction General Permit. Therefore, implementation of Mitigation Measure WQ-1 would ensure that project-related stormwater runoff would not result in substantial erosion or downstream siltation.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-4a-1: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite—program Alternative 1: 417 MW (less than significant with mitigation)

Program Alternative 1 would not construct any turbines that would result in the substantial alteration of drainage patterns or the course of any stream. New turbines would constitute a maximum of approximately 16 acres of impervious surfaces; however the existing 4,200 turbine foundations that would be removed would be replaced by a maximum of 261 turbines, resulting in a net reduction of impervious surface. Consequently, this impact would be less than significant.

Although road improvements would result in a roughly 30% increase in the extent of graveled surfaces (which can result in increased runoff) from the extent of existing graveled roads, the soils underlying the program area are predominantly high runoff soils (i.e., Hydrologic Soil Group D) (Soil Conservation Service 1966, 1977). Compacted gravel roads have runoff potential similar to that of Hydrologic Soil Group D soils. Consequently, the expanded graveled roads would not result in a net increase in runoff potential than presently exists in the native soils where the new gravel would be placed. Accordingly, because there runoff would not increase as a result of the widened gravel roads, there would not be an increase in flooding onsite or offsite. In addition, all projects conducted under the program would be required to adhere to the NPDES stormwater Construction General Permit, which requires that postconstruction runoff management measures be implemented in the event that the project's SWPPP determines that a project could cause an increase in peak runoff flows from the program area. Implementation of Mitigation Measure WQ-1 would ensure that program-related stormwater runoff would not result in flooding onsite or offsite.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-4a-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite—program Alternative 2: 450 MW (less than significant with mitigation)

Program Alternative 2 would not construct any turbines that would result in the substantial alteration of drainage patterns or the course of any stream. New turbines would constitute a maximum of approximately 17 acres of impervious surfaces; however the existing 4,200 turbine foundations that would be removed would be replaced by a maximum of 281 turbines, resulting in a net reduction of impervious surface. Consequently, this impact would be less than significant.

Although road improvements would result in a roughly 30% increase in the extent of graveled surfaces (which can result in increased runoff) from the extent of existing graveled roads, the soils underlying the program area are predominantly high runoff soils (i.e., Hydrologic Soil Group D) (Soil Conservation Service 1966, 1977). Compacted gravel roads have runoff potential similar to that of Hydrologic Soil Group D soils. Consequently, the expanded graveled roads would not result in a net increase in runoff potential than presently exists in the native soils where the new gravel would be placed. Accordingly, because there runoff would not increase as a result of the widened gravel roads, there would not be an increase in flooding onsite or offsite. In addition, all projects conducted under the program would be required to adhere to the NPDES stormwater Construction General Permit, which requires that postconstruction runoff management measures be implemented in the event that a project's SWPPP determines that the project could cause an increase in peak runoff flows from the program area. Implementation of Mitigation Measure WQ-1 would ensure that program-related stormwater runoff would not result in flooding onsite or offsite.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-4b: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite—Golden Hills Project (less than significant with mitigation)

As disclosed in the program-level analysis, the Golden Hills Project would not construct any turbines that would result in the substantial alteration of drainage patterns or the course of any stream. New turbines would constitute a maximum of approximately 3 acres of impervious surfaces; however the existing 775 turbine foundations that would be removed would be replaced by a maximum of 52 turbines, resulting in a net reduction of impervious surface. Consequently, this impact would be less than significant.

Although road improvements would result in a roughly 30% increase in the extent of graveled surfaces (which can result in increased runoff) from the extent of existing graveled roads, the soils underlying the program area are predominantly high runoff soils (i.e., Hydrologic Soil Group D) (Soil Conservation Service 1966, 1977). Compacted gravel roads have runoff potential similar to that of Hydrologic Soil Group D soils. Consequently, the expanded graveled roads would not result in a net increase in runoff potential than presently exists in the native soils where the new gravel would be placed. Accordingly, because there runoff would not increase as a result of the widened gravel roads, there would not be an increase in flooding onsite or offsite. In addition, the proposed project would be required to adhere to the NPDES stormwater Construction General Permit, which requires that postconstruction runoff management measures be implemented in the event that the project's

SWPPP determines that the project could cause an increase in peak runoff flows from the project area. Implementation of Mitigation Measure WQ-1 would ensure that program-related stormwater runoff would not result in flooding onsite or offsite.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-4c: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite—Patterson Pass Project (less than significant with mitigation)

As disclosed in the program-level analysis, the Patterson Pass Project would not construct any turbines that would result in the substantial alteration of drainage patterns or the course of any stream. New turbines would constitute a maximum of approximately 1 acre of impervious surfaces; however the existing 336 turbine foundations that would be removed would be replaced by a maximum of 13 turbines, resulting in a net reduction of impervious surface. Consequently, this impact would be less than significant.

Although road improvements would result in a roughly 30% increase in the extent of graveled surfaces (which can result in increased runoff) from the extent of existing graveled roads, the soils underlying the program area are predominantly high runoff soils (i.e., Hydrologic Soil Group D) (Soil Conservation Service 1966, 1977). Compacted gravel roads have runoff potential similar to that of Hydrologic Soil Group D soils. Consequently, the expanded graveled roads would not result in a net increase in runoff potential than presently exists in the native soils where the new gravel would be placed. Accordingly, because there runoff would not increase as a result of the widened gravel roads, there would not be an increase in flooding onsite or offsite. In addition, the proposed project would be required to adhere to the NPDES stormwater Construction General Permit, which requires that postconstruction runoff management measures be implemented in the event that the project's SWPPP determines that the project could cause an increase in peak runoff flows from the project area. Implementation of Mitigation Measure WQ-1 would ensure that program-related stormwater runoff would not result in flooding onsite or offsite.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-5a-1: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff—program Alternative 1: 417 MW (less than significant with mitigation)

The program area does not currently have existing or planned stormwater drainage facilities and buildout of the proposed program would not exceed capacities or increase the rate of polluted runoff. However, construction could generate polluted runoff as soil would be stripped, bare areas would be exposed, and stormwater could cause sedimentation. Implementation of Mitigation Measure WQ-1 would ensure that program-related stormwater runoff would not affect water quality.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-5a-2: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff—program Alternative 2: 450 MW (less than significant with mitigation)

The program area does not currently have existing or planned stormwater drainage facilities and buildout of the proposed program would not exceed capacities or increase the rate of polluted runoff. However, construction could generate polluted runoff as soil would be stripped, bare areas would be exposed, and stormwater could cause sedimentation. Implementation of Mitigation Measure WQ-1 would ensure that program-related stormwater runoff would not affect water quality.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-5b: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff—Golden Hills Project (less than significant with mitigation)

The Golden Hills Project area does not currently have existing or planned stormwater drainage facilities and construction of the proposed project would not exceed capacities or increase the rate of polluted runoff. However, construction could generate polluted runoff as soil would be stripped, bare areas would be exposed, and stormwater could cause sedimentation. Implementation of Mitigation Measure WQ-1 would ensure that project-related stormwater runoff would not affect water quality.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-5c: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff—Patterson Pass Project (less than significant with mitigation)

The Patterson Pass Project area does not currently have existing or planned stormwater drainage facilities and construction of the proposed project would not exceed capacities or increase the rate of polluted runoff. However, construction could generate polluted runoff as soil would be stripped, bare areas would be exposed, and stormwater could cause sedimentation. Implementation of Mitigation Measure WQ-1 would ensure that project-related stormwater runoff would not affect water quality.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-6a-1: Otherwise substantially degrade water quality—program Alternative 1: 417 MW (less than significant with mitigation)

Although as described in the Environmental Setting section of this section, Mountain House Creek, a tributary of Old River, is listed as impaired for chloride and salinity, and Old River is impaired for chlorpyrifos, electrical conductivity, total dissolved solids (TDS) and low dissolved oxygen (State Water Resources Control Board 2010), the program area does not currently have any substantial water quality issues or drainages that could carry a substantial amount of polluted runoff to receiving waters. In addition, program operation is not anticipated to result in a substantial amount of additional runoff that could affect water quality. However, construction could generate polluted runoff as soil would be stripped, bare areas would be exposed, and stormwater could cause sedimentation. Implementation of Mitigation Measure WQ-1 would ensure that program-related stormwater runoff would not affect water quality.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-6a-2: Otherwise substantially degrade water quality—program Alternative 2: 450 MW (less than significant with mitigation)

Although as described in the Environmental Setting section of this section, Mountain House Creek, a tributary of Old River, is listed as impaired for chloride and salinity, and Old River is impaired for chlorpyrifos, electrical conductivity, total dissolved solids (TDS) and low dissolved oxygen (State Water Resources Control Board 2010), the program area does not currently have any substantial water quality issues or drainages that could carry a substantial amount of polluted runoff to receiving waters. In addition, program operation is not anticipated to result in a substantial amount of additional runoff that could affect water quality. However, construction could generate polluted runoff as soil would be stripped, bare areas would be exposed, and stormwater could cause sedimentation. Implementation of Mitigation Measure WQ-1 would ensure that program-related stormwater runoff would not affect water quality.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-6b: Otherwise substantially degrade water quality—Golden Hills Project (less than significant with mitigation)

The Golden Hills project area does not currently have any substantial water quality issues or drainages that could carry a substantial amount of polluted runoff to receiving waters. In addition, project operation is not anticipated to result in a substantial amount of additional runoff that could affect water quality. However, construction could generate polluted runoff as soil would be stripped, bare areas would be exposed, and stormwater could cause sedimentation. Implementation of Mitigation Measure WQ-1 would ensure that project-related stormwater runoff would not affect water quality.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-6c: Otherwise substantially degrade water quality—Patterson Pass Project (less than significant with mitigation)

The Patterson Pass project area does not currently have any substantial water quality issues or drainages that could carry a substantial amount of polluted runoff to receiving waters. In addition, project operation is not anticipated to result in a substantial amount of additional runoff that could impact water quality. However, construction could generate polluted runoff as soil would be stripped, bare areas would be exposed, and stormwater could cause sedimentation. Implementation of Mitigation Measure WQ-1 would ensure that project-related stormwater runoff would not affect water quality.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-7a-1: Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map—program Alternative 1: 417 MW (no impact)

The program area would not involve construction of housing or be constructed within the 100-year floodplain (see Figure 3.9-1). There would be no impact.

Impact WQ-7a-2: Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map—program Alternative 2: 450 MW (no impact)

The program area would not involve construction of housing or be constructed within the 100-year floodplain (see Figure 3.9-1). This impact would be less than significant and no mitigation is required.

Impact WQ-7b: Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map—Golden Hills Project (no impact)

The Golden Hills Project would not involve construction of housing and would not be constructed within the 100-year floodplain (see Figure 3.9-1). There would be no impact.

Impact WQ-7c: Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map—Patterson Pass Project (no impact)

The Patterson Pass Project would not involve construction of housing and or be constructed within the 100-year floodplain (see Figure 3.9-1). There would be no impact.

Impact WQ-8a-1: Place within a 100-year flood hazard area structures that would impede or redirect floodflows—program Alternative 1: 417 MW (no impact)

The program area would not involve construction of housing or be constructed within the 100-year floodplain (see Figure 3.9-1). There would be no impact.

Impact WQ-8a-2: Place within a 100-year flood hazard area structures that would impede or redirect floodflows—program Alternative 2: 450 MW (no impact)

The program area would not involve construction of housing or be constructed within the 100-year floodplain (see Figure 3.9-1). There would be no impact.

Impact WQ-8b: Place within a 100-year flood hazard area structures that would impede or redirect floodflows—Golden Hills Project (no impact)

The Golden Hills Project would not involve construction of housing or be constructed within the 100-year floodplain (see Figure 3.9-1). There would be no impact.

Impact WQ-8c: Place within a 100-year flood hazard area structures that would impede or redirect floodflows—Patterson Pass Project (no impact)

The Patterson Pass Project would not involve construction of housing or be constructed within the 100-year floodplain (see Figure 3.9-1). There would be no impact.

Impact WQ-9a-1: Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam—program Alternative 1: 417 MW (no impact)

Because the program area is in rolling hills and there are no 100-year floodplains, the likelihood of a flood event in the area is considered minimal. In addition, because the proposed program would not involve construction of housing, if Bethany Reservoir Dam were to fail, the likelihood of significant risk or loss is considered minimal. There would be no impact.

Impact WQ-9a-2: Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam—program Alternative 2: 450 MW (less than significant)

Because the program area is in rolling hills and there are no 100-year floodplains, the likelihood of a flood event in the area is considered minimal. In addition, because the proposed program would not involve construction of housing, if Bethany Reservoir Dam were to fail, the likelihood of significant risk or loss is considered minimal. This impact would be less than significant and no mitigation is required.

Impact WQ-9b: Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam—Golden Hills Project (less than significant)

Because the Golden Hills Project area is in rolling hills and there are no 100-year floodplains, the likelihood of a flood event in the area is considered minimal. In addition, because the proposed project would not involve construction of housing, if Bethany Reservoir Dam were to fail, the likelihood of significant risk or loss is considered minimal. This impact would be less than significant and no mitigation is required.

Impact WQ-9c: Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam—Patterson Pass Project (less than significant)

Because the Patterson Pass Project area is in rolling hills and there are no 100-year floodplains, the likelihood of a flood event in the area is considered minimal. In addition, because the proposed project would not involve construction of housing, if Bethany Reservoir Dam were to fail, the likelihood of significant risk or loss is considered minimal. This impact would be less than significant and no mitigation is required.

Impact WQ-10a-1: Contribute to inundation by seiche, tsunami, or mudflow—program Alternative 1: 417 MW (less than significant with mitigation)

Because the proposed program area is in rolling hills and far from the ocean, the likelihood of a seiche or tsunami occurring is considered minimal. In addition, a mudflow is also highly unlikely, but could be possible in rolling hills if proper BMPs are not used during the construction process. Implementation of Mitigation Measure WQ-1 would ensure that program-related stormwater runoff would be properly contained and drain appropriately as to not build up or cause rills and sedimentation resulting in the potential for a mudflow.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-10a-2: Contribute to inundation by seiche, tsunami, or mudflow—program Alternative 2: 450 MW (less than significant with mitigation)

Because the proposed program area is in rolling hills and far from the ocean, the likelihood of a seiche or tsunami occurring is considered minimal. In addition, a mudflow is also highly unlikely, but could be possible in rolling hills if proper BMPs are not used during the construction process. Implementation of Mitigation Measure WQ-1 would ensure that program-related stormwater runoff would be properly contained and drain appropriately as to not build up or cause rills and sedimentation resulting in the potential for a mudflow.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-10b: Contribute to inundation by seiche, tsunami, or mudflow—Golden Hills Project (less than significant with mitigation)

Because the Golden Hills Project area is in rolling hills and far from the ocean, the likelihood of a seiche or tsunami occurring is considered minimal. In addition, a mudflow is also highly unlikely, but could be possible in rolling hills if proper BMPs are not used during the construction process. Implementation of Mitigation Measure WQ-1 would ensure that project-related stormwater runoff would be properly contained and drain appropriately as to not build up or cause rills and sedimentation resulting in the potential for a mudflow.

Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-10c: Contribute to inundation by seiche, tsunami, or mudflow—Patterson Pass Project (less than significant with mitigation)

Because the Patterson Pass Project is in rolling hills and far from the ocean, the likelihood of a seiche or tsunami occurring is considered minimal. In addition, a mudflow is also highly unlikely, but could be possible in rolling hills if proper BMPs are not used during the construction process. Implementation of Mitigation Measure WQ-1 would ensure that project-related stormwater runoff would be properly contained and drain appropriately as to not build up or cause rills and sedimentation resulting in the potential for a mudflow.

Mitigation Measure WQ-1: Comply with NPDES requirements

3.9.3 References Cited

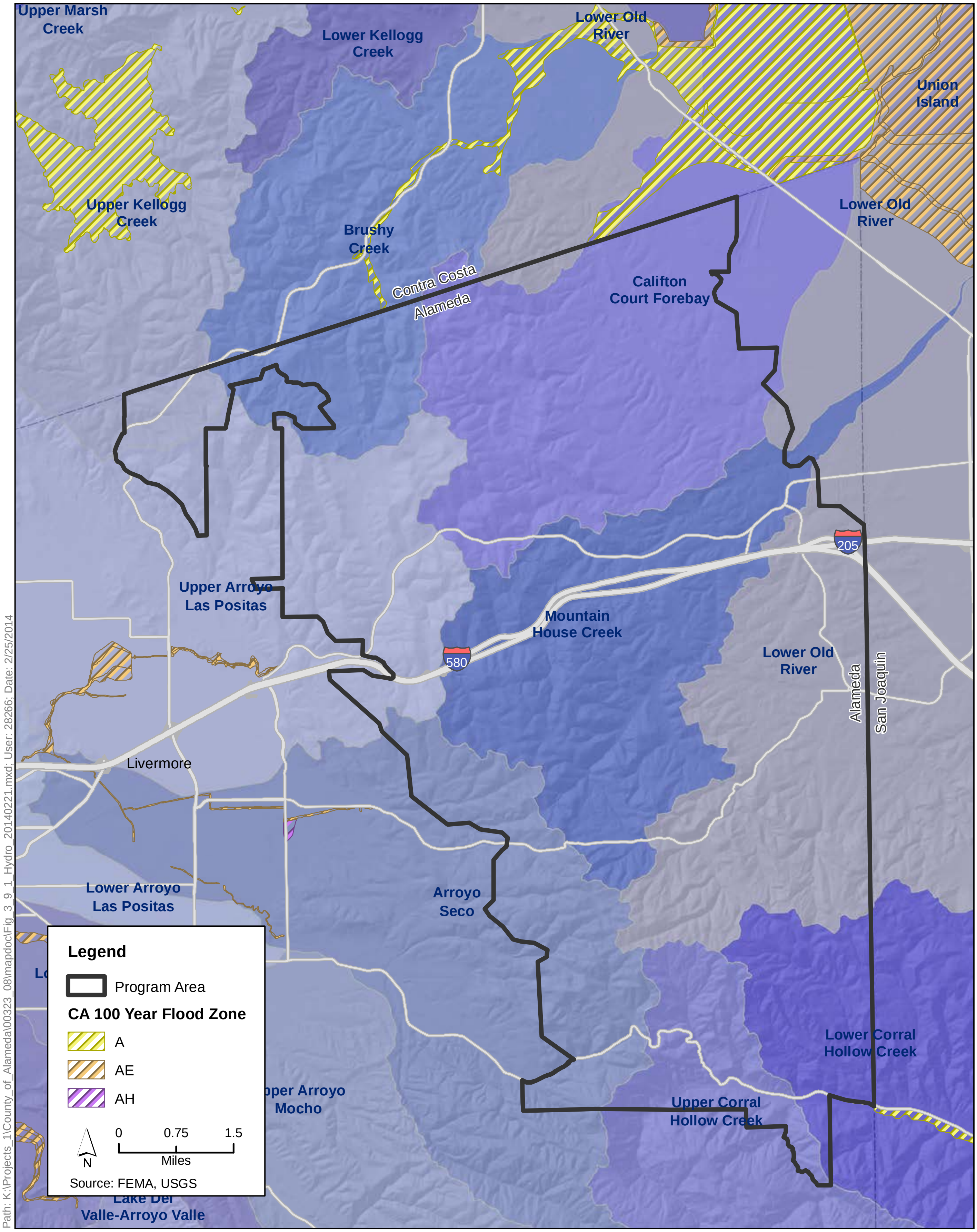
Alameda County. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

California Department of Water Resources. 2006. *San Joaquin Valley Groundwater Basin, Tracy Subbasin*. Available: http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/5-22.15.pdf. Accessed: July 1, 2013.

Central Valley Regional Water Quality Control Board. 2011. *Water Quality Control Plan for the Sacrament and San Joaquin River Basins (Basin Plan)*. Last Updated: October 2011. Available: http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/index.shtml. Accessed: July 1, 2013.

San Francisco Bay Regional Water Quality Control Board. 2011. *Water Quality Control Plan for the San Francisco Bay (Basin Plan)*. Last Updated: December 2011. Available: http://www.waterboards.ca/gov/sanfranciscobay/basin_planning.shtml. Accessed: July 1, 2013.

State Water Resources Control Board. 2010. *2010 Integrated Report (CWA Section 303(d) List of Impaired Waters)*. Available: http://www.swrcb.ca.gov/water_issues/programs/tmdl/integrated2010.shtml. Accessed: July 1, 2013.



ICF INTERNATIONAL

Figure 3.9-1
Watersheds and Floodplains in the Program Area

3.10 Land Use and Planning

This section describes the regulatory and environmental setting for land use and planning in the program and individual project areas. It also describes impacts on land use and planning that could result from implementation of the program and the two individual projects.

3.10.1 Existing Conditions

Regulatory Setting

Federal

There are no federal regulations regarding land use and planning that apply to the program or proposed projects.

State

All cities and counties are required by the state to adopt a general plan establishing goals and policies for long-term development, protection from environmental hazards, and conservation of identified natural resources (California Government Code 65300). California Government Code Section 65302 lists seven elements or chapters that cities and counties must include in their general plans: land use, circulation, housing, conservation, open space, noise, and safety.

Of the mandatory general plan elements, the land use element typically has the broadest scope. This central element describes the desired distribution, location, and extent of the jurisdiction's land uses, which may include housing; business; industry; open space, including agriculture, natural resources, recreation, and enjoyment of scenic beauty; education, public buildings and grounds; solid and liquid waste disposal facilities; and other public and private uses of land.

Local

As stated above, land use and planning are the province of local governments in California. General plans lay out the pattern of future residential, commercial, industrial, agricultural, open space, and recreational land uses within a community. To facilitate implementation of planned growth patterns, general plans typically also include goals and/or policies addressing the coordination of land use patterns with the development and maintenance of infrastructure facilities and utilities.

Local jurisdictions implement their general plans by adopting zoning, grading, and other ordinances. Zoning identifies the specific types of land uses that are allowed on a given site and establishes standards for new development.

Lands within the program area are planned and managed according to the Alameda County General Plan. The Alameda County General Plan is split into three area plans; the program and proposed projects fall entirely within the ECAP.

East County Area Plan

The ECAP guides the future development and resource conservation within unincorporated eastern Alameda County, which encompasses more than 400 square miles around the cities of Dublin, Livermore, Pleasanton, and east of Hayward. This area extends from the Pleasanton/Dublin ridgeline on the west to the San Joaquin County line on the east and from the Contra Costa County line on the north to the Santa Clara County line on the south.

The ECAP contains goals, policies, and procedures regarding land use, including urban and rural development, sensitive lands and open space, public facilities, and special land uses (Alameda County 2000). Several of its land use policies and programs apply to the program and proposed projects. Various ECAP policies specifically relating to selected environmental resources (e.g., aesthetics, hazards and hazardous materials, noise) are presented in the regulatory setting discussions of those resource sections.

Relevant general open space land use policies are listed below.

Policy 52: The County shall preserve open space areas for the protection of public health and safety, provision of recreational opportunities, production of natural resources (e.g., agriculture, windpower, and mineral extraction), protection of sensitive viewsheds (see definition in Table 1 [of East Area County Plan]), preservation of biological resources, and the physical separation between neighboring communities (see Figure 4 [of East Area County Plan]).

Policy 53: The County shall preserve a continuous band of open space consisting of a variety of plant communities and wildlife habitats to provide comprehensive, rather than piecemeal, habitat conservation for all of East County. This open space should, as much as possible, be outside of the Urban Growth Boundary and contiguous to large open space areas of Contra Costa, Santa Clara, and San Joaquin Counties.

Policy 70: The County shall work with the East Bay Regional Park District (EBRPD), the Livermore Area Recreation and Park District (LARPD), and other relevant agencies to ensure that open space trails adjacent to San Joaquin, Contra Costa, and Santa Clara Counties connect with trail systems in these other counties.

Relevant agriculture land use policies are listed below.

Policy 71: The County shall conserve prime soils (Class I and Class II, as defined by the USDA Soil Conservation Service Land Capability Classification) and Farmland of Statewide Importance and Unique Farmland (as defined by the California Department of Conservation Farmland Mapping and Monitoring Program) outside the Urban Growth Boundary.

Policy 89: The County shall retain rangeland in large, contiguous blocks of sufficient size to enable commercially viable grazing.

Policy 92: The County shall encourage the retention of existing large parcels of greater than 320 acres in remote areas designated “Large Parcel Agriculture” or “Resource Management,” where the parcels are not well served by roads, infrastructure, and services.

Relevant windfarm land use policies and implementation programs are listed below.

Policy 169: The County shall allow for continued operation, new development, redevelopment, and expansion of existing and planned windfarm facilities within the limits of environmental constraints.

Policy 170: The County shall protect nearby existing uses from potential traffic, noise, dust, visual, and other impacts generated by the construction and operation of windfarm facilities.

Environmental Setting

The program area is characterized by mostly treeless, rolling hills of annual grassland. Livermore, approximately 1 mile west of the program area boundary, is the nearest established community to the program area.

The primary land designation in the program area is Large Parcel Agriculture. The dominant land uses are wind energy generation, agriculture, and cattle grazing. The rural-residential districts on Dyer and Midway Roads are separate, small rural communities.

Golden Hills Project

Like the rest of the program area, the Golden Hills project area is characterized by rolling foothills of annual grassland, and it is mostly treeless. The land consists of undeveloped grazing land. The Golden Hills project area is zoned A (Agriculture), which is intended to promote implementation of general plan land use proposals (or designations) for agricultural and other nonurban uses.

Land use in the Golden Hills project area is designated as Large Parcel Agriculture. Permitted uses include a variety of agricultural and agricultural support uses. Wind generation is a conditionally permitted use, and privately owned wind electric generators appear throughout the project area.

Patterson Pass Project

Like the rest of the program area, the Patterson Pass project area is characterized by rolling foothills of annual grassland, and it is mostly treeless. The land consists of undeveloped grazing land. The Patterson Pass project area is zoned A (Agriculture), and privately owned wind electric generators are a conditionally permitted use.

The Patterson Pass Project area is designated as Large Parcel Agriculture.

3.10.2 Environmental Impacts

This section describes the impact analysis relating to land use for the proposed program and two individual projects. It describes the methods used to determine the impacts of the projects and program and identifies the thresholds used to conclude whether an impact would be significant. If applicable, measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion.

Methods for Analysis

Analysis of land use within the program area involved a review of the Alameda County Zoning Map, General Plan Land Designation Map, and other applicable land use plans to determine whether any land uses would be adversely affected. CEQA does not require an assessment of the degree to which a project conforms to land use policy or promotes general plan goals or objectives, with the exception of policies that have been adopted specifically to protect an environmental resource addressed by CEQA.

Determination of Significance

In accordance with Appendix G of the State CEQA Guidelines, program Alternative 1, program Alternative 2, the Golden Hills project, or the Patterson Pass project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Physically divide an established community.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.
- Conflict with any applicable habitat conservation plan or natural community conservation plan.

Impacts and Mitigation Measures

Impact LU-1a-1: Physically divide an established community—program Alternative 1: 417 MW (no impact)

There are no established communities in the program area that would be bisected by any development associated with Alternative 1. The program area is in a rural area of Alameda County with only two small rural community districts. The program area and vicinity are primarily used for cattle grazing and wind energy production. The dominant land use category in the program area is rural. Accordingly, the program would not divide an established community. There would be no impact.

Impact LU-1a-2: Physically divide an established community—program Alternative 2: 450 MW (no impact)

There are no established communities in the program area that would be bisected by any development associated with Alternative 2. The program area is in a rural area of Alameda County with only two small rural community districts. The program area and vicinity are primarily used for cattle grazing and wind energy production. The dominant land use category in the program area is rural. Accordingly, the program would not divide an established community. There would be no impact.

Impact LU-1b: Physically divide an established community—Golden Hills Project (no impact)

There are no established communities within the Golden Hills project area. It is located in a rural area of Alameda County. This project area and vicinity are primarily used for cattle grazing and wind energy production. Accordingly, the Golden Hills Project would not divide an established community. There would be no impact.

Impact LU-1c: Physically divide an established community—Patterson Pass Project (no impact)

There are no established communities within the Patterson Pass project area. It is located in a rural area of Alameda County. The Patterson Pass project area and vicinity are primarily used for cattle grazing and wind energy production. Accordingly, the Patterson Pass Project would not divide an established community. There would be no impact.

Impact LU-2a-1: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect—program Alternative 1: 417 MW (no impact)

Program Alternative 1 consists of operational modifications, removal and replacement of wind turbines, and site reclamation in eastern Alameda County. Land uses within and adjacent to the program area include grazing land, scattered rural residences, and other windfarms. Program area lands are under agricultural use and are designated LPA. Wind energy production is a conditionally permitted use, and wind turbines exist throughout the program area. The program would not conflict with any applicable land use plan, policy, or regulation, including the Alameda County General Plan, the ECAP or the Alameda County Zoning Ordinance. As permitted in the ECAP, windpower operations are compatible with the preservation of open space, habitat conservation, and the County's trail system, and would therefore not conflict with Policies 52, 53, or 70 of the ECAP. The program would also be compatible with ECAP agricultural land use Policies 71, 89, and 92 for the preservation of prime soils, rangelands, and large parcels. The program would directly serve to implement Policies 169 and 170 regarding the continued and redeveloped use of land for windfarms, and the PEIR supports development of measures to mitigate adverse traffic, noise, dust, visual, and other effects of windfarms on existing sensitive land uses. Accordingly, program implementation would not result in any changes to existing land uses or pose any land use conflicts. There would be no impact. No mitigation is required.

Impact LU-2a-2: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect—program Alternative 2: 450 MW (no impact)

Program Alternative 2 consists of operational modifications, removal and replacement of wind turbines, and site reclamation in eastern Alameda County. Land uses within and adjacent to the program area include grazing land, scattered rural residences, and other windfarms. Program area lands are under agricultural use and are designated LPA. Wind energy production is a conditionally permitted use, and wind turbines exist throughout the program area. The program would not conflict with any applicable land use plan, policy, or regulation, including the Alameda County General Plan, the ECAP or the Alameda County Zoning Ordinance. As permitted in the ECAP, windpower operations are compatible with the preservation of open space, habitat conservation, and the County's trail system, and would therefore not conflict with Policies 52, 53, or 70 of the ECAP. The program would also be compatible with ECAP agricultural land use Policies 71, 89, and 92 for the preservation of prime soils, rangelands, and large parcels. The program would directly serve to implement Policies 169 and 170 regarding the continued and redeveloped use of land for windfarms, and the PEIR supports development of measures to mitigate adverse traffic, noise, dust, visual, and other effects of windfarms on existing sensitive land uses. Accordingly, program implementation would not result in any changes to existing land uses or pose any land use conflicts. There would be no impact. No mitigation is required.

Impact LU-2b: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect—Golden Hills Project (no impact)

The Golden Hills Project consists of operational modifications, removal and replacement of wind turbines, and site reclamation in several large parcels in eastern Alameda County. Land uses within and adjacent to the Golden Hills project area include grazing land, scattered rural residences, and other windfarms. Project area lands are under agricultural use with extensive windfarm operations. Wind turbines exist throughout the project area and constitute a conditionally permitted use. The Golden Hills Project would not conflict with any applicable land use plan, policy, or regulation, including the Alameda County General Plan, the ECAP or the Alameda County Zoning Ordinance. Accordingly, project implementation would not result in any changes to existing land uses or pose any land use conflicts. There would be no impact. No mitigation is required.

Impact LU-2c: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect—Patterson Pass Project (no impact)

The Patterson Pass Project consists of operational modifications, removal and replacement of wind turbines, and site reclamation in eastern Alameda County. Land uses within and adjacent to the Patterson Pass project area include grazing land, scattered rural residences, and other windfarms. Project area lands are under agricultural use with extensive windfarm operations. Wind turbines exist throughout the project area and constitute a conditionally permitted use. The Patterson Pass Project would not conflict with any applicable land use plan, policy, or regulation, including the ECAP or the Alameda County Zoning Ordinance. Accordingly, project implementation would not result in any changes to existing land uses or pose any land use conflicts. There would be no impact. No mitigation is required.

Impact LU-3a-1: Conflict with any applicable habitat conservation plan or natural community conservation plan—program Alternative 1: 417 MW (no impact)

The program area is not within an HCP or NCCP area. Accordingly, it would not conflict with an HCP or NCCP. There would be no impact.

Impact LU-3a-2: Conflict with any applicable habitat conservation plan or natural community conservation plan—program Alternative 2: 450 MW (no impact)

The program area is not within an HCP or NCCP area. Accordingly, it would not conflict with an HCP or NCCP. There would be no impact.

Impact LU-3b: Conflict with any applicable habitat conservation plan or natural community conservation plan—Golden Hills Project (no impact)

The Golden Hills project area is not within an HCP or NCCP area. Accordingly, it would not conflict with an HCP or NCCP. There would be no impact.

Impact LU-3c: Conflict with any applicable habitat conservation plan or natural community conservation plan—Patterson Pass Project (no impact)

The Patterson Pass project area is not within an HCP or NCCP area. Accordingly, it would not conflict with an HCP or NCCP. There would be no impact.

3.10.3 References Cited

Alameda County. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

3.11 Noise

This section describes the environmental setting and regulatory setting for noise. It also describes the noise impacts, if any, that would result from implementation of the program and two individual projects. Where applicable, mitigation measures are described that would reduce these impacts.

3.11.1 Existing Conditions

Background Information on Noise

Noise for the purposes of environmental analysis under CEQA is commonly defined as sound that annoys or disturbs people and potentially causes an adverse psychological or physiological effect on human health. Because noise is an environmental pollutant that can interfere with human activities, evaluation of noise is necessary when considering the environmental impacts of a proposed project.

Sound is mechanical energy (vibration) transmitted by pressure waves over a medium such as air or water. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient (existing) sound level. Although the decibel (dB) scale, a logarithmic scale, is used to quantify sound intensity, it does not accurately describe how sound intensity is perceived by human hearing. The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called *A-weighting*, written as *dBA* and referred to as *A-weighted decibels*. Table 3.11-1 defines sound measurements and other terminology used in this chapter, and Table 3.11-2 summarizes typical A-weighted sound levels for different noise sources.

In general, human sound perception is such that a change in sound level of 1 dB cannot typically be perceived by the human ear, a change of 3 dB is barely noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level when comparing similar sounds (i.e., traffic to traffic).

Different types of measurements are used to characterize the time-varying nature of sound. These measurements include the equivalent sound level (L_{eq}), the minimum and maximum sound levels (L_{min} and L_{max}), percentile-exceeded sound levels (such as L_{10}, L_{20}), the day-night sound level (L_{dn}), and the community noise equivalent level (CNEL). L_{dn} and CNEL values differ by less than 1 dB. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such in this assessment.

For a point source such as a stationary compressor or construction equipment, sound attenuates based on geometry at rate of 6 dB per doubling of distance. For a line source such as free flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance (California Department of Transportation 2009). Atmospheric conditions including wind, temperature gradients, and humidity can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound that travels over an acoustically absorptive surface such as grass attenuates at a greater rate than sound that travels over a hard surface such as pavement. The increased attenuation is typically in the range of 1 to 2 dB per doubling of distance. Barriers such as buildings and topography that block the line of sight between a source and receiver also increase the attenuation of sound over distance.

Table 3.11-1. Definition of Sound Measurements

Sound Measurements	Definition
Decibel (dB)	A unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
C-Weighted Decibel (dBC)	The sound pressure level in decibels as measured using the C-weighting filter network. The C-weighting is very close to an unweighted or “flat” response. C-weighting is only used in special cases when low-frequency noise is of particular importance. A comparison of measured A and C weighted level gives an indication of low frequency content.
Maximum Sound Level (L_{max})	The maximum sound level measured during the measurement period.
Minimum Sound Level (L_{min})	The minimum sound level measured during the measurement period.
Equivalent Sound Level (L_{eq})	Leq represents an average of the sound energy occurring over a specified period. In effect, Leq is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A weighted equivalent sound level (Leq[h]) is the energy average of A-weighted sound levels occurring during a 1-hour period.
Percentile-Exceeded Sound Level (L_{xx})	The sound level exceeded “xx” percent of a specific time period. L_{10} is the sound level exceeded 10 percent of the time. L_{90} is the sound level exceeded 90 percent of the time. L_{90} is often considered to be representative of the background noise level in a given area.
Day-Night Level (L_{dn})	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
Community Noise Equivalent Level (CNEL)	The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
Peak Particle Velocity (Peak Velocity or PPV)	A measurement of ground vibration defined as the maximum speed (measured in inches per second) at which a particle in the ground is moving relative to its inactive state. PPV is usually expressed in inches/sec.
Frequency: Hertz (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure.

Table 3.11-2. Typical A-weighted Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	—110—	Rock band
Jet flyover at 1,000 feet		
	—100—	
Gas lawnmower at 3 feet		
	—90—	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	—80—	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	—70—	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	—60—	
		Large business office
Quiet urban daytime	—50—	Dishwasher in next room
Quiet urban nighttime	—40—	Theater, large conference room (background)
Quiet suburban nighttime		
	—30—	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	—20—	
		Broadcast/recording studio
	—10—	
	—0—	

Source: California Department of Transportation 2009.

Other Factors Related to Wind Turbines

Operating wind turbines can generate two types of sound: mechanical sound from components such as gearboxes, generators, yaw drives, and cooling fans; and aerodynamic sound from the flow of air over and past the rotor blades. Modern wind turbine design has greatly reduced mechanical sound, which is generally unnoticeable in comparison with the aerodynamic sound, which is often described as a "swishing" or "whooshing" sound. The International Standard IEC 61400-11 for wind turbine noise assessment provides a requirement for evaluating tonality close to the turbine. Far field tonality at typical residential distances may be evaluated using a variety of methods; however, if a tone is not present at the IEC test location it should not materialize at the residence. Tones are then divided into categories of prominent tone, audible tone, or no tone. (Illingworth & Rodkin 2006.) Compared with other, primarily older wind turbines, the modern wind turbines that would be installed through the repowering program have several characteristics that reduce aerodynamic sound levels. The modern turbines typically are *upwind* turbines, meaning each turbine faces into the wind, so the wind encounters the rotor blades before the tower and nacelle, making for quieter operations than a downwind turbine. Additionally, the modern turbines have relatively low rotational speeds and pitch control on the rotors, both of which reduce sound levels.

Wind turbines produce a broadband sound (i.e., the sound occurs over a wide range of frequencies, including low and high frequencies). Low-frequency sounds are in the range of 20–100 Hz, and infrasonic sound (or *infrasound*) is low-frequency sound of less than 20 hertz. Compared with higher frequency sound, low-frequency sound propagates over longer distances, is transmitted through buildings more readily, and at high levels can excite structural vibrations (e.g., rattling windows or doors). The threshold of perception, in decibels, also increases as the frequency decreases. For example, in the frequency range where humans hear best (in the low kilohertz), the threshold of hearing is at about 0 dB, but at a frequency of only 10 Hz, the threshold of hearing is at about 100 dB (Rogers et al. 2006a).

Older wind turbines—particularly those in which the blades were on the downwind side of the tower—produced more low-frequency sound because their towers blocked wind flow, causing the blades to pass through more turbulent air. Modern, upwind turbines produce a broadband sound that includes low-frequency sounds, but not at significant levels. A primary cause for low-frequency sounds in modern turbines is the blade passing through unusually turbulent wind conditions. The uneven air that causes this effect may be due to interaction of other turbines, excessive wind shear, or topography (Bowdler 2008). These factors may also contribute to periodic increases in the prominence of blade swish.

The University of Massachusetts at Amherst reported on noise measurements made at four different wind turbines ranging from 450 kilowatts to 2 megawatts (Rogers et al. 2006b). The results indicated that at distances of no more than 118 meters (387 feet) from the turbines, all infrasound levels were below human perception levels. The report further states that there is “no reliable evidence that infrasound below the hearing threshold produces physiological or psychological effects.” This lack of effects at levels below the hearing threshold was supported by a scientific advisory panel composed of medical doctors, audiologists, and acoustical professionals established by the American and Canadian Wind Energy Associations to review wind turbine sound and health effects (Colby et al. 2009). It was also supported by Canadian and Australian government reviews of available scientific literature (Australia National Health and Medical Research Council 2010; Ontario Chief Medical Officer of Health 2010).

Additional recent studies conducted on a 2.3 MW Siemens SWT-2.3-93 turbine (O’Neal et al. 2010) are a useful point of reference with the regard to low frequency noise generated by a modern wind turbine generator. These studies concluded that the Siemens SWT-2.3-93 wind turbine at maximum noise at a distance of about 305 meters (1,000 feet) from the nearest residence does not pose a low frequency noise or infrasound problem. At this distance the turbine satisfies the following objectives.

- Meets American National Standards Institute/American Standards Association [ANSI/ASA] S12.2 indoor levels for low frequency sound for bedrooms, classrooms, and hospitals.
- Meets ANSI/ASA S12.2 indoor levels for moderately perceptible vibrations in lightweight walls and ceilings.
- Meets ANSI S12.9 Part 4 thresholds for annoyance and beginning of rattles.
- Produces no audible infrasound capable of detection by the most sensitive listeners.

Wind generates sound when it interacts with structures and vegetation on the ground. The amount of sound generated can vary widely depending primarily on the amount of vegetation in the area and the speed of the wind. For a given wind speed, the sound level in a desert with no trees or vegetation will be different than in a highly vegetated area. When trees are in full leaf, wind in the trees rustles the leaves and high frequency sound is produced (Hoover and Keith 2000). The amount of sound generated depends on wind speed, the distance from the observed position to the trees or foliage, and the approximate frontal area of the trees or foliage as seen from the observed position. Sound levels generated by wind can range from about 20 dBA to 60 dBA for wind speeds in the range of 2 to 20 miles per hour (Hoover and Keith 2000).

Regulatory Setting

Federal

Federal, state, and local agencies regulate different aspects of environmental noise. Generally, the federal government sets noise standards for transportation-related noise sources closely linked to interstate commerce. These include aircraft, locomotives, and trucks. The state government sets noise standards for transportation noise sources such as automobiles, light trucks, and motorcycles. Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through noise ordinances and general plan policies. Local general plans identify general principles intended to guide and influence development plans.

State

Part 2, Title 24 of the California Code of Regulations "California Noise Insulation Standards" establishes minimum noise insulation standards to protect persons within new hotels, motels, dormitories, long-term care facilities, apartment houses, and dwellings other than single-family residences. Under this regulation, interior noise levels attributable to exterior noise sources cannot exceed 45 L_{dn} in any habitable room. Where such residences are located in an environment where exterior noise is 60 L_{dn} or greater, an acoustical analysis is required to ensure that interior levels do not exceed the 45 L_{dn} interior standard.

The *State of California General Plan Guidelines* (Governor's Office of Planning and Research 2003) identifies guidelines for the noise elements of local general plans, including a sound level/land use compatibility chart that categorizes, by land use, outdoor L_{dn} ranges in up to four categories (normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable). For many land uses, the chart shows overlapping L_{dn} ranges for two or more compatibility categories.

The noise element guideline chart identifies the normally acceptable range of L_{dn} values for low-density residential uses as less than 60 dB and the conditionally acceptable range as 55–70 dB. The normally acceptable range for high-density residential uses is identified as L_{dn} values of less than 65 dB, and the conditionally acceptable range is identified as 60–70 dB. For educational and medical facilities, L_{dn} values of less than 70 dB are considered normally acceptable, and L_{dn} values of 60–70 dB are considered conditionally acceptable. For office and commercial land uses, L_{dn} values of less than 70 dB are considered normally acceptable, and L_{dn} values of 67.5–77.5 are categorized as conditionally acceptable. When noise levels are in the conditionally acceptable range new construction should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation requirements are included in the design.

These overlapping L_{dn} ranges are intended to indicate that local conditions (existing sound levels and community attitudes toward dominant sound sources) should be considered in evaluating land use compatibility at specific locations.

Local

General Plan Noise Element

The Alameda County General Plan Noise Element (Alameda County 1976) contains goals, objectives, and implementation programs for the entire county to provide its residents with an environment that is free from excessive noise and that promotes compatibility of land uses with respect to noise. The Countywide Noise Element does not explicitly define the acceptable outdoor noise level for the backyards of single-family homes or common outdoor spaces of multi-family housing projects, but it recognizes the Federal Environmental Protection Agency (EPA) noise level standards for residential land uses. These standards are an exterior L_{dn} of 55 dBA and an interior L_{dn} of 45 dBA. (The L_{dn} measurement, which also includes a 10dB weighting for night-time sound, is approximately equal to the CNEL for most environmental settings.) The Noise Element also references noise and land use compatibility standards developed by an Association of Bay Area Governments (ABAG)-sponsored study.

East County Area Plan

Alameda County's ECAP (Alameda County 2000) contains the following goal, policies and implementation programs related to community noise and windfarms.

Goal: To minimize East County residents' and workers' exposure to excessive noise.

Policies

Policy 170: The County shall protect nearby existing uses from potential traffic, noise, dust, visual, and other impacts generated by the construction and operation of windfarm facilities.

Policy 288: The County shall endeavor to maintain acceptable noise levels throughout East County.

Policy 289: The County shall limit or appropriately mitigate new noise sensitive development in areas exposed to projected noise levels exceeding 60 dB based on the California Office of Noise Control Land Use Compatibility Guidelines.

Policy 290: The County shall require noise studies as part of development review for projects located in areas exposed to high noise levels and in areas adjacent to existing residential or other sensitive land uses. Where noise studies show that noise levels in areas of existing housing will exceed "normally acceptable" standards (as defined by the California Office of Noise Control Land Use Compatibility Guidelines), major development projects shall contribute their pro-rated share to the cost of noise mitigation measures such as those described in Program 104.

Implementation Programs

Program 74: The County shall amend the Zoning Ordinance to incorporate siting and design standards for wind turbines to mitigate biological, visual, noise, and other impacts generated by windfarm operations.

Program 104: The County shall require the use of noise reduction techniques (such as buffers, building design modifications, lot orientation, sound walls, earth berms, landscaping, building setbacks, and real estate disclosure notices) to mitigate noise impacts generated by transportation-related and stationary sources as specified in the California Office of Noise Control Land Use Compatibility Guidelines.

Noise Ordinance

Alameda County's noise ordinance (County General Code, Chapter 6.60) allows higher noise exposure levels for commercial properties than for residential uses, schools, hospitals, churches, or libraries. These standards augment the state-mandated requirements of the Alameda County Building Code, which establishes standards for interior noise levels consistent with the noise insulation standards in the California State Building Code. Table 3.11-3 shows the number of cumulative minutes that a particular external noise level is permitted, as well as the maximum noise allowed under the Alameda County General Code.

Table 3.11-3. Alameda County Exterior Noise Standards

Cumulative Number of Minutes in Any 1-Hour Time Period Daytime	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Residential uses, schools, hospitals, churches, and libraries		
30	50 dBA	45 dBA
15	55 dBA	50 dBA
5	60 dBA	55 dBA
1	65 dBA	60 dBA
Maximum	70 dBA	65 dBA
Commercial uses		
30	65 dBA	60 dBA
15	70 dBA	65 dBA
5	75 dBA	70 dBA
1	80 dBA	75 dBA
Maximum	85 dBA	80 dBA

Source: Alameda County General Code, Chapter 6.60.

The provisions of the ordinance do not apply to noise sources associated with construction, provided the activities do not take place before 7 a.m. or after 7 p.m. on any day except Saturday or Sunday, or before 8 a.m. or after 5 p.m. on Saturday or Sunday.

Conditional Use Permits

The County's CUPs for the continued operation of the windfarms after 2005, regulated by Resolution Number R-2005-463, identified the following specific condition regarding noise levels.

> Noise Standards: Wind turbines shall be operated so as to not exceed the County's noise standard of 55 dBA (L_{dn}) or 70 dBC (L_{dn}) as measured in both cases at the exterior of any dwelling unit. If the dwelling unit is on land under lease from the Permittee, the applicable standard shall be 65 dBA (L_{dn}) and 70 dBC (L_{dn}).

The County has determined that use of a single 55 dBA standard will be sufficient to ensure that no 70 dBC threshold is exceeded. Research and analysis indicate that a low-frequency noise level of 70 dBC could not be reached unless the noise level were also well over the 55 dBA threshold.

The Resolution approving the CUPs for windfarm operations included a finding that as a land use, the wind energy use "is properly related to other land uses and transportation and service facilities in the vicinity, in that… d) Although some residents may object to the visual, noise, or other effects of the turbines, the County has determined that the wind energy projects are in compliance with the conditions of approval and are an acceptable use in the area."

Environmental Setting

Existing Land Uses

The program area is the Alameda County portion of the HCP-revised APWRA. The area is designated as Large Parcel Agriculture under the County Zoning Ordinance and the ECAP. General agriculture, single-family residences, grazing, and riding or hiking trails are allowed uses. Conditional uses that may be allowed through a CUP granted by the County include outdoor recreation facilities, transmission facilities, solid waste landfills, and windfarms. CUPs are developed to be consistent with general plan policies and other land uses permitted by the County's general plan.

Program Area

Scattered single-family rural residences are located within the program boundary, including homes on both very large parcels (more than 100 acres) and comparatively small lots (less than 5 acres). Single-family rural residences are mostly located along the west and northeast sides of the program area. Within the program boundary, several residences along Altamont Pass Road are located as close as about 600 feet from existing turbines. Two residences along Flynn Road are located about 800 feet from existing turbines. Several residences located along Dyer Road are within about 1,100 feet of existing turbines. No other residences are located within 1,500 feet of the existing turbines in the program boundary.

Golden Hill Project Area

Two residences located along Flynn Road are about 800 feet from the nearest turbines within the project boundary. No other residences are located within 1,500 feet of the existing turbines within the project boundary.

Patterson Pass Project Area

The closest residence is located off Patterson Pass Road about 2,200 feet away of the nearest turbines within the project boundary.

Existing Noise Conditions

Traffic on I-580 and wind turbine operations are the predominant sources of noise in the program area. Based on traffic noise projections for 2010, the 60 L_{dn} contour for traffic traveling on I-580 extends about 1,800 feet from the freeway (Alameda County 2000).

The following is a summary of ambient noise measurements conducted at seven positions in the Altamont Pass area on May 17, 2013 (ICF International 2013). These measurements are generally representative of noise levels in the program area where first generation wind turbines are currently operating.

- Position M1. Altamont Pass Road 1.2 miles west of West Grant Line Road. 300 feet from the nearest operating turbine.
- Position M2. Altamont Pass Road 1.1 miles west of West Grant Line Road. 380 feet from the nearest operating turbine.

- Position M3. Altamont Pass Road 0.7 miles west of West Grant Line Road. 750 feet from the nearest operating turbine.
- Position M4. Mountain House Road. 1.4 miles north of West Grant Line Road. 590 feet from the nearest operating turbine.
- Position M5. Mountain House Road. 500 feet north of West Grant Line Road. 1,200 feet from the nearest operating turbine.
- Position M6. North Midway Road. 0.9 miles south of I-205. 315 feet from the nearest operating turbine.
- Position M7. North Midway Road. 0.6 miles south of I-205. 1,710 feet from the nearest operating turbine.

Table 3.11-4. Summary of Noise Measurements in the APWRA

Position	Start Time	Duration	L_{eq}	L_{max}	L_{min}	L_{10}	L_{33}	L_{50}	L_{90}
M1	10:17 a.m.	5 min	58.4	67.9	54.7	60.4	58.3	57.5	55.9
M2	10:38 a.m.	5 min	56.1	62.6	53.6	57.6	56.0	55.5	54.3
M3	10:38 a.m.	5 min	53.3	67.2	49.1	54.5	62.9	52.3	50.5
M4	11:24 a.m.	5 min	56.7	73.6	51.2	57.4	56.1	55.6	53.8
M5	11:43 a.m.	5 min	47.0	60.3	40.8	50.0	46.6	45.6	43.1
M6	12:18 p.m.	5 min	50.0	55.0	44.6	52.1	50.5	49.6	47.1
M7	12:36 p.m.	5 min	56.8	65.4	50.9	59.1	56.9	55.6	52.6

Although sound from existing operating turbines is audible adjacent to them, there is no documented evidence that noise standards of the existing CUPs, as defined above in the *Conditional Use Permits* section, have been exceeded.

3.11.2 Environmental Impacts

This section describes the impact analysis relating to noise for the proposed program and the Golden Hills and Patterson Pass projects. It describes the methods used to determine the impacts of the program and projects and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the impact discussion.

Methods for Analysis

Wind Turbine Noise

The proposed program would replace the existing turbines (first- and second-generation turbines) with fewer and larger current-generation turbines. Section 2.3 of this Program EIR, *Wind Turbine Technology*, provides a description and comparison of existing and proposed turbines. The specific types or sound data of current generation wind turbines to be used in the program area are not known and, therefore, the levels of noise produced by the installation of new turbines cannot be specifically determined. However, noise produced by current generation turbines such as the REpower MM 92 turbine and the Vestas V90 turbine are known to produce a sound level of about 44 dBA at 1,000 feet (Solano County 2011). Continuous operation over a 24-hour period would result in about 50 dBA (L_{dn}) at 1,000 feet. At any given receptor location, the received noise level from turbine operation could be potentially influenced by several turbines, depending on the geometric relationship between the turbines and the receptor. Table 3.11-5 provides an indication of potential received noise levels expressed in dBA (L_{dn}) based on the distance to a receiver and the number of turbines influencing noise received at the receptor. The table also highlights (using shading) the distances within which the County standard of 55 dBA (L_{dn}) would be exceeded. Under the assumption that up to 10 turbines could affect the received noise level at a receptor, the results in Table 3.11-5 indicate that the County noise standard of 55 dBA (L_{dn}) could be exceeded within about 1,750 feet of a receptor.

Table 3.11-5. Turbine Noise Level, dBA (L_{dn}), as a Function of Distance and Number of Turbines

	Number of Turbines Influencing the Received Noise Level						
Distance (feet)	1	2	3	4	5	7	10
500	56	59	61	62	63	64	66
550	55	58	60	61	62	63	65
750	52	55	57	58	59	60	62
1,000	50	53	55	56	57	58	60
1,150	49	52	54	55	56	57	59
1,250	48	51	53	54	55	56	58
1,400	47	50	52	53	54	55	57
1,500	46	49	51	52	53	54	56
1,750	45	48	50	51	52	53	55
2,000	44	47	49	50	51	52	54
2,500	42	45	47	48	49	50	52
3,000	40	43	45	46	47	48	50

Note: Based on simple geometric attenuation of 6 dB per doubling of distance.

Construction Noise

Construction activities would involve the use of heavy equipment. To assess noise impacts associated with these activities, construction equipment is identified and noise is evaluated using methods recommended by the Federal Highway Administration (Federal Highway Administration 2006). Noise impacts associated with increased construction traffic is evaluated using methods for the FHWA traffic noise model (TNM).

As discussed above in *Conditional Use Permits*, the County has historically used a noise standard for wind turbines in the program area of 55 dBA (L_{dn}) or 70 dBC (L_{dn}) at dwelling units, with the exception that dwelling units on the same parcel being leased for windfarm use may be exposed to up to 65 dBA (L_{dn}). Noise impacts associated with the proposed program are evaluated based on how the project would change the daily noise level associated with wind turbine operations. The threshold of 5 dB is used because it is generally considered to be the lowest sound level change clearly noticeable by the human ear.

Determination of Significance

In accordance with Appendix G of the State CEQA Guidelines and the County conditions of approval for the existing turbine operations, program Alternative 1, program Alternative 2, the Golden Hills project, or the Patterson Pass project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Exposure of residences to noise from new wind turbines in excess of 55 dBA (L_{dn}) where wind turbine noise is currently less than 55 dBA (L_{dn}). In the situation where the dwelling unit is on the same parcel being leased for windfarm, 65 dBA (L_{dn}) is used as the threshold.
- Exposure of residences to a daily noise increase in L_{dn} value of more than 5 dB from the addition of new wind turbines where the existing noise level is in excess of 55 dBA (L_{dn}). In the situation where the dwelling unit is on the same parcel being leased for windfarm, 65 dBA (L_{dn}) is used as the threshold.
- Exposure of residences to equipment noise associated with construction activities that exceed Alameda County noise ordinance standards (Table 3.11-3) during nonexempt hours (7 p.m. to 7 a.m. on weekdays and 5 p.m. to 8 a.m. on Saturday and Sunday).

Impacts and Mitigation Measures

Impact NOI-1a-1: Exposure of residences to noise from new wind turbines—program Alternative 1: 417 MW (less than significant with mitigation)

Program Alternative 1 would replace the existing turbines (first- and second-generation turbines) with fewer and larger current-generation turbines. The location and types of turbines to be used would be determined as projects are proposed. Section 2.5.2 discusses County siting requirements and technical siting requirements for the proposed turbines; updated setback requirements are presented in Table 2-2.

As discussed above, there are no documented instances of wind turbines causing exceedance of noise standards in the existing CUPs. In addition, current-generation turbines expected to be installed through the repowering program have several characteristics that reduce aerodynamic sound levels. The modern turbines typically are *upwind* turbines, meaning each turbine faces into the wind, so the wind encounters the rotor blades before the tower and nacelle, making for quieter operations than a downwind turbine. Additionally, the modern turbines have relatively low rotational speeds and pitch control on the rotors, both of which reduce sound levels.

The noise prediction results in Table 3.11-5, however, indicate that residences located within about 1,500 feet of a group of turbines could be exposed to noise that exceeds 55 dBA (L_{dn}Because of the possibility that implementation of program Alternative 1 could result in daily L_{dn} values caused by wind turbines to increase by more than 5 dB at locations where noise currently exceeds 55 dBA (L_{dn}), or expose residences to noise in excess of 55 dBA (L_{dn}) where noise is currently less than 55 dBA (L_{dn}), this impact is considered to be significant. Implementation of Mitigation Measure NOI-1 would reduce this impact to a less-than-significant level.

Mitigation Measure NOI-1: Perform project-specific noise studies and implement measures to comply with County noise standards

The applicant for any proposed repowering project will retain a qualified acoustic consultant to prepare a report that evaluates noise impacts associated with operation of the proposed wind turbines. This evaluation will include a noise monitoring survey to quantify existing noise conditions at noise sensitive receptors located within 2,000 feet of any proposed turbine location. This survey will include measurement of the daily A-weighted L_{dn} values over a 1-week period and concurrent logging of wind speeds at the nearest meteorological station. The study will include a site-specific evaluation of predicted operational noise levels at nearby noise sensitive uses. If operation of the project is predicted to result in noise in excess of 55 dBA (L_{dn}) where noise is currently less than 55 dBA (L_{dn}) or result in a 5 dB increase where noise is currently greater than 55 dBA(L_{dn}), the applicant will modify the project, including selecting new specific installation sites within the program area, to ensure that these performance standards will not be exceeded.

Methods that can be used to ensure compliance with these performance standards include but not limited to increasing the distance between proposed turbines and noise sensitive uses and the use of alternative turbine operational modes to reduce noise. Upon completion of the evaluation, the project applicant will submit a report to the County demonstrating how the project will comply with these performance standards. After review and approval of the report by County staff, the applicant will incorporate measures as necessary into the project to ensure compliance with these performance standards.

Impact NOI-1a-2: Exposure of residences to noise from new wind turbines—program Alternative 2: 450 MW (less than significant with mitigation)

Program Alternative 2 would replace the existing turbines (first- and second-generation turbines) with fewer and larger current-generation turbines. The location and types of turbines to be used would be determined as projects are proposed. Section 2.5.2 discusses County siting requirements and technical siting requirements for the proposed turbines; updated setback requirements are presented in Table 2-2.

As discussed above, there are no documented instances of wind turbines causing exceedance of noise standards in the existing CUPs. In addition, current-generation turbines expected to be installed through the repowering program have several characteristics that reduce aerodynamic sound levels. The modern turbines typically are *upwind* turbines, meaning each turbine faces into the wind, so the wind encounters the rotor blades before the tower and nacelle, making for quieter operations than a downwind turbine. Additionally, the modern turbines have relatively low rotational speeds and pitch control on the rotors, both of which reduce sound levels.

The noise prediction results in Table 3.11-5, however, indicate that residences located within about 1,500 feet of a group of turbines could be exposed to noise that exceeds 55 dBA (L_{dn}). Because of the possibility that implementation of program Alternative 2 could result in daily L_{dn} values caused by wind turbines to increase by more than 5 dB at locations where noise currently exceeds 55 dBA (L_{dn}) or expose residences to noise in excess of 55 dBA (L_{dn}) where noise is currently less than 55 dBA (L_{dn}) this impact is considered to be significant. Implementation of Mitigation Measure NOI-1 would reduce this impact to a less-than-significant level.

Mitigation Measure NOI-1: Perform project-specific noise studies and implement measures to comply with County noise standards

Impact NOI-1b: Exposure of residences to noise from new wind turbines—Golden Hills Project (less than significant with mitigation)

The project would remove the majority of the existing turbines (about 734 turbines) in the project area and install 27 to 48 larger, current-generation turbines. The specific sound data for turbines to be used in the project area are not known. Figure 2-15 shows the layout of proposed turbines in the project area. The new turbines would be installed farther from existing residences than the existing turbines. Two residences located along Flynn Road that are about 800 feet from the existing turbines would be about 1,300 to 1,800 feet from proposed turbines.

As discussed under Impact NOI-1a, there are no documented instances of wind turbines causing exceedance of noise standards in the existing CUPs. In addition, proposed modern turbines have several characteristics that reduce aerodynamic sound levels and make for quieter operations than the existing turbines. The modern turbines have relatively low rotational speeds and pitch control on the rotors, both of which reduce sound levels.

The noise prediction results in Table 3.11-5 however, indicate that residences located within about 1,500 feet of a group of turbines could be exposed to noise that exceeds 55 dBA (L_{dn}) or increases in noise greater than 5 dB. No new turbines are anticipated to be located within 1,000 feet of existing residences. Because of the possibility that daily L_{dn} value caused by wind turbines could increase by more than 5 dB at locations where noise currently exceeds 55 dBA (L_{dn}) or expose residences to noise in excess of 55 dBA (L_{dn}) where noise is currently less than 55 dBA (L_{dn}) this impact is considered to be significant. Implementation of Mitigation Measure NOI-1, as discussed under Impact NOI-1a, would reduce this impact to a less-than-significant level.

Mitigation Measure NOI-1: Perform project-specific noise studies and implement measures to comply with County noise standards

Impact NOI-1c: Exposure of residences to noise from new wind turbines—Patterson Pass Project (less than significant)

Implementation of the project would remove the existing turbines (about 317 turbines) in the project area and install 8 to 12 larger, current-generation turbines. Figure 2-17 shows the layout of proposed turbines in the project area. The specific type of turbine to be used and turbine-specific noise levels have not yet been determined. The new turbines would be installed farther away from the existing residence. One residence located off Patterson Pass Road is currently located about 2,200 feet from the existing turbines and would be located about 3,300 feet from the nearest proposed new turbines.

As discussed under Impact NOI-1a, there are no documented instances of wind turbines causing exceedance of noise standards in the existing CUPs. In addition, proposed modern turbines have several characteristics that reduce aerodynamic sound levels and make for quieter operations than the existing turbines. The modern turbines have relatively low rotational speeds and pitch control on the rotors, both of which reduce sound levels.

The noise prediction results in Table 3.11-5 indicate that residences located within about 1,750 feet of a group of turbines could be exposed to noise that exceeds 55 dBA (L_{dn}) or increases in noise greater than 5 dB. Because the nearest residence would be more than 3,000 feet from the new turbines, operation of the new turbines is not expected to result in noise that exceeds 55 dBA(L_{dn}) or result in a 5 dBA increase in noise at residences. The operational noise impact is considered to be less than significant. No mitigation is required.

Impact NOI-2a-1: Exposure of residences to noise during decommissioning and new turbine construction—program Alternative 1: 417 MW (less than significant with mitigation)

Construction Equipment Noise

Program Alternative 1 would generally involve the following construction phases.

- Phase 1—Decommissioning of existing wind turbines and foundation removal
- Phase 2—Construction of laydown areas, substations and switch yards
- Phase 3—Road construction
- Phase 4—Construction of turbine foundations and batch plant
- Phase 5—Turbine delivery and installation
- Phase 6—Utility collector line installation
- Phase 7—Cleanup and restoration

Table 3.11-6 lists the construction equipment that is expected to be used for each construction phase, based on the assumptions provided in Appendix D.

Table 3.11-6. Construction Phases and Equipment

Construction Phase	Equipment
1—Decommissioning and foundation removal	Crane, truck and lowboy trailer, excavator, grader, dump truck
2—Laydown areas, substations and switch yards construction	Road grader, track type dozer, drum type compactor, water truck, truck and lowboy trailer, backhoe/front loader
3—Road construction	Road grader, track type dozer, drum type compactor, water truck, truck and lowboy trailer, backhoe/front loader, excavator, rock crusher
4—Turbine foundations and batch plant	Road grader, track type dozer, drum type compactor, water truck, truck and lowboy trailer, backhoe/front loader, excavator, rock crusher, cement truck
5—Turbine delivery and installation	Crane, truck and lowboy trailer, excavator
6—Utility collector line installation	Water truck, backhoe/front loader, trencher, horizontal directional drilling (HDD) bore machine
7—Cleanup and restoration	Road grader, excavator

Source: Appendix D.

Table 3.11-7 summarizes typical noise levels produced by anticipated construction equipment (Federal Highway Administration 2006). L_{max} sound levels at 50 feet are shown along with the typical acoustical use factors. The acoustical use factor is the percentage of time each piece of construction equipment is assumed to be operating at full power (i.e., its noisiest condition) during construction operation and is used to estimate L_{eq} values from L_{max} values. For example, the L_{eq} value for a piece of equipment that operates at full power 50% of the time (acoustical use factor of 50) is 3 dB less than the L_{max} value.

Table 3.11-7. Typical Construction Equipment Noise Levels

Equipment Type	Typical L_{max} Noise Level at 50 Feet from Source (dBA)	Acoustical Use Factor (%)	L_{eq} Noise Level at 50 Feet from Source (dBA)
Cement truck	79	40	75
Compactor	83	20	76
Crane	81	16	73
Dozer	82	40	78
Dump truck	76	40	72
Excavator	81	40	77
Flat-bed truck	74	40	70
Front-end loader	79	40	75
Grader	85	40	81
HDD bore machine	82	25	76
Rock crusher	85	50	82
Trencher	80	50	77
Water truck	76	40	72

Source: Federal Highway Administration 2006.

Table 3.11-8 summarizes the combined noise level of equipment associated with each construction phase.

Table 3.11-8. Combined Noise Level by Construction Phase

Construction Phase	L_{max} Noise Level at 50 Feet from Source (dBA)	L_{eq} Noise Level at 50 Feet from Source (dBA)
1—Decommissioning and foundation removal	88	83
2—Laydown areas, substations and switch yards construction	89	85
3—Road construction	91	87
4—Turbine foundations and batch plant	95	86
5—Turbine delivery and installation	84	79
6—Utility collector line installation	86	81
7—Cleanup and restoration	86	82

Based on geometric attenuation of 6 dB per doubling of distance and additional attenuation resulting from ground absorption and atmospheric effects, potential construction noise levels at various distances for each construction phase have been calculated relative to the Alameda County noise ordinance standards. Table 3.11-9 summarizes the results of this analysis and identifies distances within which Alameda County noise standards could be exceeded as a result of the construction activities. The calculations of construction equipment noise levels are included in Appendix D.

Table 3.11-9. Construction Noise Analysis

	Daytime Hours (7 a.m. to 10 p.m.)		Nighttime Hours (10 p.m. to 7 a.m.)	
Construction Phase	Distance (feet) to 70 dBA L_{max}	Distance (feet) to 50 dBA L_{eq}	Distance (feet) to 65 dBA L_{max}	Distance (feet) to 45 dBA L_{eq}
1—Decommissioning and foundation removal	235	820	345	1,105
2—Laydown areas, substations and switch yards construction	260	910	385	1,225
3—Road construction	290	1,130	460	1,520
4—Turbine foundations and batch plant	435	1,035	625	1,390
5—Turbine delivery and installation	170	545	270	865
6—Utility collector line installation	190	675	285	1,075
7—Cleanup and restoration	205	750	300	1,190

In a number of instances, there are residences located 600 to 800 feet of where turbine construction activities could occur. The results in Table 3.11-9 indicate that construction activities could result in noise that exceeds Alameda County noise ordinance standards during nonexempt hours. Therefore, the exposure of residences to construction equipment noise is considered to be a significant impact. Implementation of Mitigation Measure NOI-2 would reduce this impact to a less-than-significant level.

Mitigation Measure NOI-2: Employ noise-reducing practices during decommissioning and new turbine construction

Project applicants will employ noise-reducing construction practices so that construction noise does not exceed Alameda County noise ordinance standards. Measures to limit noise may include the following:

- Prohibit noise-generating activities before 7 a.m. and after 7 p.m. on any day except Saturday or Sunday, and before 8 a.m. and after 5 p.m. on Saturday or Sunday.
- Locate equipment as far as practical from noise sensitive uses.
- Require that all construction equipment powered by gasoline or diesel engines have sound-control devices that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation.
- Use noise-reducing enclosures around noise-generating equipment where practicable.

- Implement other measures with demonstrated practicability in reducing equipment noise upon prior approval by the County.

In no case will the applicant be allowed to use gasoline or diesel engines without muffled exhausts.

Construction Traffic Noise

Based on the analysis for Vasco Wind Repowering Project (Contra Costa County 2010), which is in the program vicinity, and data provided by the project applicants, a typical 80 MW repowering project in the program area is anticipated to generate an average of 420 vehicle trips per day (300 truck trips and 120 worker trips) through the course of the construction period. The construction traffic noise impact is evaluated using the recent traffic volumes collated on Patterson Pass Road, which is considered as a typical major county road that would be used for construction crews to access the project area. The traffic volumes along Patterson Pass Road are about 2,700 to 3,700 vehicles per day (Alameda County 2013). The construction traffic increase would increase traffic noise by less than 2 dB, which would not be a noticeable increase at nearby residential uses along the major county roads. Therefore, the traffic noise impact during construction is considered to be less than significant.

Impact NOI-2a-2: Exposure of residences to noise during decommissioning and new turbine construction—program Alternative 2: 450 MW (less than significant with mitigation)

Construction Equipment Noise

Program Alternative 2 would generally involve the following construction phases.

- Phase 1—Decommissioning of existing wind turbines and foundation removal
- Phase 2—Construction of laydown areas, substations and switch yards
- Phase 3—Road construction
- Phase 4—Construction of turbine foundations and batch plant
- Phase 5—Turbine delivery and installation
- Phase 6—Utility collector line installation
- Phase 7—Cleanup and restoration

Table 3.11-6 lists the equipment that is expected to be used for each construction phase, based on the assumptions provided in Appendix D.

Table 3.11-7 summarizes typical noise levels produced by anticipated construction equipment (Federal Highway Administration 2006). L_{max} sound levels at 50 feet are shown along with the typical acoustical use factors. The acoustical use factor is the percentage of time each piece of construction equipment is assumed to be operating at full power (i.e., its noisiest condition) during construction operation and is used to estimate L_{eq} values from L_{max} values. For example, the L_{eq} value for a piece of equipment that operates at full power 50% of the time (acoustical use factor of 50) is 3 dB less than the L_{max} value.

Table 3.11-8 summarizes the combined noise level of equipment associated with each construction phase.

Based on geometric attenuation of 6 dB per doubling of distance and additional attenuation resulting from ground absorption and atmospheric effects, potential construction noise levels at various distances for each construction phase have been calculated relative to the Alameda County noise ordinance standards. Table 3.11-9 summarizes the results of this analysis and identifies distances within which Alameda County noise standards could be exceeded as a result of the construction activities. The calculations of construction equipment noise levels are included in Appendix D.

In a number of instances, there are residences located 600 to 800 feet of where turbine construction activities could occur. The results in Table 3.11-9 indicate that construction activities could result in noise that exceeds Alameda County noise ordinance standards during nonexempt hours. Therefore, the exposure of residences to construction equipment noise is considered to be a significant impact. Implementation of Mitigation Measure NOI-2 would reduce this impact to a less-than-significant level.

Mitigation Measure NOI-2: Employ noise-reducing practices during decommissioning and new turbine construction

Construction Traffic Noise

Based on the analysis for Vasco Wind Repowering Project (Contra Costa County 2010), which is in the program vicinity, and data provided by the project applicants, a typical 80 MW repowering project in the program area is anticipated to generate an average of 420 vehicle trips per day (300 truck trips and 120 worker trips) through the course of the construction period. The construction traffic noise impact is evaluated using the recent traffic volumes collated on Patterson Pass Road, which is considered as a typical major county road that would be used for construction crews to access the project area. The traffic volumes along Patterson Pass Road are about 2,700 to 3,700 vehicles per day (Alameda County 2013). The construction traffic increase would increase traffic noise by less than 2 dB, which would not be a noticeable increase at nearby residential uses along the major county roads. Therefore, the traffic noise impact during construction is considered to be less than significant.

Impact NOI-2b: Exposure of residences to noise during decommissioning and new turbine construction—Golden Hills Project (less than significant with mitigation)

Construction noise levels associated with anticipated construction phases and equipment for repowering projects are discussed under Impact NOI-2a and summarized in Tables 3.11-7 and 3.11-8. Table 3.11-9 summarizes the distances within which Alameda County noise standards could be exceeded as a result of the construction activities.

In a number of instances, there are residences located within 800 feet of where turbine removal and restoration activities could occur. The results in Table 3.11-9 indicate that these activities could result in noise that exceeds Alameda County noise ordinance standards during nonexempt hours. This impact is therefore considered to be significant. Implementation of Mitigation Measure NOI-2 would reduce this impact to a less-than-significant level.

Mitigation Measure NOI-2: Employ noise-reducing practices during decommissioning and new turbine construction

As discussed under Impact NOI-2a-1 and NOI-2a-2, the construction traffic increase would increase traffic noise by less than 2 dB, which would not be a noticeable increase at nearby residential uses along the major county roads. Therefore, the impact of construction traffic noise is considered to be less than significant.

Impact NOI-2c: Exposure of residences to noise during decommissioning and new turbine construction—Patterson Pass Project (less than significant)

Construction noise levels associated with anticipated construction phases and equipment for repowering projects are discussed under Impact NOI-2a and summarized in Tables 3.11-7 and 3.11-8. Table 3.11-9 summarizes the distances within which Alameda County noise standards could be exceeded as a result of the construction activities.

Because the closest residence is located about 2,200 feet from the nearest turbines, which is beyond the impact distances identified in Table 3.11-9, the construction noise impact on residences is considered to be less than significant. No mitigation is required.

As discussed under Impact NOI-2a-1 and NOI-2a-2, the construction traffic increase would increase traffic noise by less than 2 dB, which would not be a noticeable increase at nearby residential uses along the major county roads. Therefore, the impact of construction traffic noise is considered to be less than significant.

3.11.3 References Cited

Alameda County. 1976. *General Plan Noise Element*. Adopted January 8. Amended May 5, 1994.

———. 2000. *East County Area Plan*. Adopted May 1994. Oakland, CA. Modified by passage of Measure D, effective December 22, 2000. Available: http://www.acgov.org/cda/planning/generalplans/index.htm. Accessed: March 1, 2013.

———. 2013. *Patterson Pass Road and Tesla Road Safety Study*. Public Meeting Presentation on March 27. Alameda County Public Works Agency. Available: http://www.acgov.org/pwa/updates/pattersonpassstudy.htm. Accessed: June 27, 2013.

Australia National Health and Medical Research Council. 2010. *Wind Turbines and Health: A Rapid Review of the Evidence*. July.

Bowdler, D. 2008. Amplitude Modulation of Wind Turbine Noise: A Review of the Evidence. *Institute of Acoustics Bulletin* 33(4).

California Department of Transportation. 2009. *Technical Noise Supplement to the Traffic Noise Analysis Protocol*. November. Available: http://www.dot.ca.gov/hq/env/noise/. Accessed: March 1, 2013.

Colby, W. D., R. Dobie, G. Leventhall, D. M. Lipscomb, R. J. McCunney, M. T. Seilo, B. Sondergaard. 2009. *Wind Turbine Sound and Health Effects: An Expert Panel Review*. December. Prepared for American Wind Energy Association and Canadian Wind Energy Association.

Contra Costa County. 2010. *Vasco Winds Repowering Project Draft Environmental Impact Report*. December. Department of Conservation and Development. Martinez, CA.

Federal Highway Administration. 2006. *FHWA Roadway Construction Noise Model User's Guide*. FHWA-HEP-05-054. January.

Governor's Office of Planning and Research. 2003. *State of California General Plan Guidelines*. Sacramento, CA. Available: http://www.opr.ca.gov. Accessed: March 1, 2013.

Hoover, R. M., and R. H. Keith. 2000. *Noise Control for Buildings*, *Manufacturing Plants*, *Equipment*, *and Products*. Lecture notes, first published 1981. Houston, TX: Hoover & Keith Inc.

ICF International. 2013. *Noise Technical Report for the Sand Hill Wind Project, Alameda County, CA*. Draft. June. Sacramento, CA.

Illingworth & Rodkin. 2006. *Montezuma Wind Project Noise Technical Report*, *Solano County, California*. Petaluma, CA.

O'Neal R. D., R. D. Hellweg, Jr., R. M. Lampeter. 2010. *Low Frequency Sound and Infrasound from Wind Turbines*. April. Acoustical Society of America, 159th Meeting Lay Language Papers.

Ontario Chief Medical Officer of Health. 2010. *The Potential Health Impact of Wind Turbines*. May. Ontario, Canada.

Rogers, A. L., J. F. Manwell, S. Wright. 2006a. *Wind Turbine Acoustic Noise*. January. Renewable Energy Research Laboratory, Department of Mechanical and Industrial Engineering, University of Massachusetts. Amherst, MA.

Rogers, A. L., Ph.D., 2006b. *Wind Turbine Noise, Infrasound and Noise Perception*. Renewable Energy Research Laboratory, University of Massachusetts at Amherst. January 18. Available: <http://www.windpoweringamerica.gov/pdfs/workshops/mwwg_turbine_noise.pdf>

Solano County. 2011. *Shiloh IV Wind Energy Project Environmental Impact Report*. November 30. Prepared for Solano County Department of Resource Management.

3.12 Population and Housing

This section describes the regulatory and environmental setting for population and housing in the Program and individual project areas. It also describes impacts on these resources that could result from implementation of the Program and the two individual projects.

3.12.1 Existing Conditions

Regulatory Setting

Federal

There are no relevant federal regulations for population and housing.

State

There are no relevant state regulations for population and housing other than the California Department of Housing and Community Development's (HCD) Regional Housing Needs Assessment, which is discussed below.

Local

Association of Bay Area Governments Regional Housing Need Allocation

The Regional Housing Need Assessment (RHNA) process addresses the need for housing across a range of incomes and in all communities throughout the state. To ensure that adequate housing is available for all income groups, HCD is responsible for determining this regional need in coordination with the Association of Bay Area Governments (ABAG). ABAG is required to distribute the region's share of statewide need to the cities and counties within its jurisdiction.

The purpose of the RHNA is to allocate to cities and counties their *fair share* of the Bay Area's projected housing need by household income groups, which are categorized as very low, low, moderate, and above moderate. The RHNA allocates 1,769 units to unincorporated Alameda County (Association of Bay Area Governments 2013). Alameda County is required to adopt a housing element in compliance with this allocation.

East County Area Plan

The ECAP contains goals and policies related to population and housing (Alameda County 2000). Polices related to population and housing are listed below. For additional analysis of program consistency with ECAP goals and policies, refer to Section 3.10, *Land Use and Planning*.

Policy 14: The County shall promote an approximate balance between jobs and housing within East County and shall further promote a range of housing types reflecting the income distribution of the local employment base.

Policy 15: The County shall evaluate all proposed major projects for their effect on the East County jobs/housing ratio and the provision of housing affordable to East County workers as well as the potential impacts on adjacent counties, especially in terms of in-commuting. To the extent feasible, the County shall impose measures on projects in the unincorporated County to reduce potential impacts arising from inadequate provision of housing, and shall encourage the cities to do the same.

Environmental Setting

Population

The population of Alameda County in 2010 was 1,510,271 (Association of Bay Area Governments 2010). During the 20-year period from 1990 to 2010, the County's population increased by approximately 18%. During the 20-year period from 2010 to 2030, the population in unincorporated Alameda County is expected to increase by 17.2% to 171,500, with an average growth rate of 4.0% every 5 years. Table 3.12-1 presents the anticipated growth for both the unincorporated County and the County as a whole.

Table 3.12-1. Unincorporated Alameda County and Countywide Population Growth Projections 2010–2030

Year	Unincorporated Alameda County Population	Percent Change		Alameda County Population	Percent Change	
		Incremental	Cumulative		Incremental	Cumulative
2010	146,300	–	–	1,510,271[a]	–	–
2015	151,700	3.7	3.7	1,626,100	7.7	7.7
2020	158,700	4.6	8.5	1,705,900	4.9	13.0
2025	164,900	3.9	12.7	1,787,300	4.8	18.3
2030	171,500	4.0	17.2	1,874,600	4.9	24.1

Source: Association of Bay Area Governments 2009.

[a] Data for 2010 Alameda County is from the 2010 U.S. Census (Association of Bay Area Governments 2010).

Housing

Housing Units

In 2010, there were 50,022 housing units in unincorporated Alameda County (Table 3.12-2). This is an increase of 1,430 from 2000. Approximately 95.1% of the housing units were occupied in 2010, compared with 97.9% in 2000. In Alameda County as a whole, there were 540,183 housing units in 2000 and 582,549 housing units in 2010. Approximately 96.9% percent of the housings units were occupied in 2000 and 93.6% were occupied in 2010.

Table 3.12-2. Unincorporated Alameda County and Countywide Housing Units 2000, 2010

	2000	2010
Unincorporated Alameda County		
Total housing units	49,595	50,022
Change in housing units	–	+1,430
Occupied housing units	48,529	48,516
Change in occupied housing units		-13
Percent occupied	97.9	95.1
Alameda County		
Total housing units	540,183	582,549
Change in housing units	–	+42,366
Occupied housing units	523,366	545,138
Change in occupied housing units	–	+21,772
Percent occupied	96.9	93.6

Source: Association of Bay Area Governments 2010.

Households

There are some scattered rural-residential areas and agricultural housing areas located within the program area. Between 2000 and 2010, the number of households in the county and in the Bay Area[1] increased by approximately 4.1% and 5.8%, respectively. As shown in Table 3.12-3, ABAG projects that the number of households in unincorporated Alameda County will increase by approximately 17.8% by 2030, with an average increase of approximately 4.2% every 5 years.

Table 3.12-3. Unincorporated Alameda County and Countywide Household Growth Projections 2010–2030

Year	Unincorporated Alameda County Households	Percent Change		Alameda County Households	Percent Change	
		Incremental	Cumulative		Incremental	Cumulative
2010	51,700			545,138[a]	–	–
2015	53,910	4.3	4.3	585,400	7.4	7.4
2020	56,310	4.5	8.9	615,470	5.1	12.9
2025	58,620	4.1	13.4	645,680	4.9	18.4
2030	60,910	3.9	17.8	676,280	4.7	24.1

Source: Association of Bay Area Governments 2009.
[a] Data for 2010 is from the 2010 U.S. Census (Association of Bay Area Governments 2010).

[1] The Bay Area consists of nine counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma.

Employment

ABAG estimates that Alameda County will experience an approximately 36% increase in jobs, from 712,850 jobs in 2010 to 970,490 jobs in 2030. Table 3.12-4 summarizes the projected 5-year incremental increases in jobs in the county as a whole from 2010 to 2030.

Table 3.12-4. Alameda County Jobs and Employed Resident Projections

	2010	2015	2020	2025	2030
Total jobs	712,850	761,270	825,070	897,810	970,490
Employed residents	725,200	778,900	868,800	950,800	1,025,100
Jobs per employed resident	0.98	0.98	0.95	0.94	0.95

Source: Association of Bay Area Governments 2009.

Since 2010, Alameda County has had more employed residents than jobs (Table 3.12-4), which means that workers are commuting out of Alameda County. This trend is expected to continue through 2030. By 2015, Alameda County is projected to have 761,270 jobs and 778,900 employed residents, a ratio of 0.98 jobs for every employed resident. This ratio is expected to decrease to 0.94:1 or 0.95:1 until 2030 (Association of Bay Area Governments 2009).

In 2010, there were approximately 54,000 construction jobs in Alameda County. This was an increase of approximately 2,200 from 2000 (Association of Bay Area Governments 2009). The State of California estimates there will be 2,520 job openings for construction workers in Alameda and Contra Costa Counties during the 2010–2020 time period (California Employment Development Department 2012).

In 2010, there were approximately 85,900 unemployed persons in Alameda County, an unemployment rate of approximately 11.3%. By 2012, the unemployment rate had fallen to approximately 9.0% (California Employment Development Department 2013).

3.12.2 Environmental Impacts

Methods for Analysis

Identifying the proposed program's and projects' impacts on population and housing involves a review of program and project information, ABAG's *Projections 2009*, and the ECAP.

Determination of Significance

In accordance with Appendix G of the State CEQA Guidelines, Program Alternative 1, Program Alternative 2, the Golden Hills project, or the Patterson Pass project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure).
- Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere.

- Displace a substantial number of people, necessitating the construction of replacement housing elsewhere.

Impacts and Mitigation Measures

Impact POP-1a-1: Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)—program Alternative 1: 417 MW (no impact)

Program Alternative 1 would not create any housing and would, therefore, not result in a direct increase in population. Indirect population growth is discussed below.

Construction

As described in Chapter 2, *Project Description*, the duration of construction for a repowering project depends on the number of turbines repowered and the ease of access to the site. Not all repowering projects would be initiated simultaneously. Construction would result in a temporary increase in construction-related job opportunities in the local area. However, construction workers can be expected to be drawn from the construction employment labor force already residing in the region.

The opportunities provided by construction of the various repowering projects would not likely result in household relocation by construction workers to the program area because these jobs would be temporary; consequently, Alternative 1 is not expected to change the current ratio of 0.98 jobs per employed resident. Employment opportunities provided by construction under Alternative 1 would not generate population growth. There would be no impact. No mitigation is required.

Operation and Maintenance

Operation and maintenance of the repowered wind turbines would be similar to operation and maintenance of the existing windfarms. Activities would be conducted year-round, with operation, monitoring, and control of wind turbines performed continuously. Operation and maintenance would require full-time, skilled workers. It is expected that these workers would be sourced from the existing pool of personnel that is employed for operation and maintenance of the existing windfarms. Therefore, operation and maintenance of the repowered wind turbines would not create new jobs and would not induce population growth or an increased demand for housing.

Program implementation would result in the construction of new service roads and electrical infrastructure. The service roads would provide access to various project facilities within the program area, including wind turbines and substations. The purpose of the new electrical infrastructure would be to transfer power generated by the turbines to the regional electrical grid. The roads and electrical infrastructure would be privately owned and would neither extend offsite nor provide convenient connection points for potential offsite development. Therefore, any new infrastructure installed in the program area would not encourage new development or induce population growth.

The proposed program would allow for generation of electricity for distribution to the electrical grid. The generation of wind energy is necessary to meet the legal requirement for investor-owned utilities, electric service providers, and community choice aggregators to procure 33% of energy from renewable resources by 2020. The Program would replace the existing wind turbines with new, current-generation wind turbines. Moreover, wind energy is intended to reduce reliance on gas-fired power plants in the region. Because the results of repowering would not exceed the existing energy generation cap of 417 MW in the program area, Alternative 1 is not considered growth-inducing. There would be no impact. No mitigation is required.

Impact POP-1a-2: Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)—program Alternative 2: 450 MW (no impact)

Program Alternative 2 would not create any housing and would, therefore, not result in a direct increase in population. Indirect population growth is discussed below.

Construction

As described in Chapter 2, *Project Description*, the duration of construction for a repowering project depends on the number of turbines repowered and the ease of access to the site. Not all repowering projects would be initiated simultaneously. Construction would result in a temporary increase in construction-related job opportunities in the local area. However, construction workers can be expected to be drawn from the construction employment labor force already residing in the region.

The opportunities provided by construction of the various repowering projects would not likely result in household relocation by construction workers to the program area because these jobs would be temporary and, thus, the proposed program is not expected to change the current ratio of 0.98 jobs per employed resident. Therefore, employment opportunities provided by construction under the program would not generate population growth. There would be no impact. No mitigation is required.

Operation and Maintenance

Operation and maintenance of the repowered wind turbines would be similar to operation and maintenance of the existing windfarms. Activities would be conducted year-round, with operation, monitoring, and control of wind turbines performed continuously. Operation and maintenance would require full-time, skilled workers. It is expected that these workers would be sourced from the existing pool of personnel that is employed for operation and maintenance of the existing windfarms. Therefore, operation and maintenance of the repowered wind turbines would not create new jobs and would not induce population growth or an increased demand for housing.

Program implementation would result in the construction of new service roads and electrical infrastructure. The service roads would provide access to various project facilities within the program area, including wind turbines and substations. The purpose of the new electrical infrastructure would be to transfer power generated by the turbines to the regional electrical grid. The roads and electrical infrastructure would be privately owned and would neither extend offsite nor provide convenient connection points for potential offsite development. Therefore, any new infrastructure within the program area would not encourage new development or induce population growth.

The proposed program would allow for generation of electricity for distribution to the electrical grid. The generation of wind energy is necessary to meet the legal requirement for investor-owned utilities, electric service providers, and community choice aggregators to procure 33% of energy from renewable resources by 2020. Alternative 2 would replace the existing wind turbines with new, current-generation wind turbines. Moreover, wind energy is intended to reduce reliance on gas-fired power plants in the region. Although this alternative would result in an 8% increase over the currently permitted generation capacity of the program area, it is unlikely that an additional 33

MW would constitute a substantial stimulus to regional growth. Therefore, program Alternative 1 is not considered growth-inducing. There would be no impact. No mitigation is required.

Impact POP-1b: Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)—Golden Hills Project (no impact)

The Golden Hills Project would not create any housing and would, therefore, not result in a direct increase in population. Indirect population growth is discussed below.

Construction

Construction of the Golden Hills Project is expected to occur in phases, with a typical phase anticipated to last from 8 months up to 1 year. The majority of the activities, primarily wind turbine installation, would take place during a four-month period. Construction would result in a temporary increase in construction-related jobs in the local area. However, the new jobs provided by construction of the Golden Hills Project would be temporary and, therefore, would not likely result in household relocation by construction workers to the project vicinity.

Construction workers can be expected to be drawn from the construction employment labor force already residing in the region. The construction jobs would not be permanent and are not expected to change the current ratio of 0.98 jobs per employed resident. Therefore, employment opportunities provided by construction of the Golden Hills Project would not generate population growth. There would be no impact. No mitigation is required.

Operation and Maintenance

Operation and maintenance of the Golden Hills Project would be similar to operation and maintenance of the existing NextEra windfarm. Activities would be conducted year-round, with operation, monitoring, and control of wind turbines performed continuously. Operation and maintenance would require full-time, skilled workers. It is expected that these workers would be sourced from the existing pool of personnel that is employed for operation and maintenance of the existing NextEra windfarm. Therefore, operation and maintenance of the Golden Hills Project would not create new jobs and would not induce population growth or an increased demand for housing.

Project implementation would result in the construction of new service roads and electrical infrastructure. The service roads would provide access to various project facilities within the project area, including wind turbines and substations. The purpose of the new electrical infrastructure would be to transfer power generated by the turbines to the regional electrical grid. The roads and electrical infrastructure would be privately owned and would neither extend offsite nor provide convenient connection points for potential offsite development. Therefore, any new infrastructure within the project area would not encourage new development or induce population growth.

The Golden Hills Project would allow for generation of electricity for distribution to the electrical grid. The generation of wind energy is necessary to meet the state legal requirement for investor-owned utilities, electric service providers, and community choice aggregators to procure 33% of energy from renewable sources by 2020. The Golden Hills Project would repower the existing first- and second-generation turbines with current-generation turbines. Repowering would result in only a minor exceedance of the existing 88.4 MW nameplate capacity of the Golden Hills Project. Therefore, it is not considered growth-inducing. There would be no impact. No mitigation is required.

Impact POP-1c: Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)—Patterson Pass Project (no impact)

The Patterson Pass Project would not create any housing and would, therefore, not result in a direct increase in population. Indirect population growth is discussed below.

Construction

Construction of the Patterson Pass Project would take between 6 and 9 months. Construction would result in a temporary increase in construction-related job opportunities in the local area. However, the new jobs provided by construction of the Patterson Pass Project would be temporary and, therefore, would not likely result in household relocation by construction workers to the project area.

Construction workers can be expected to be drawn from the construction employment labor force already residing in the region. These jobs would not be permanent and are not expected to change the current ratio of 0.98 jobs per employed resident. Therefore, employment opportunities provided by construction of the Patterson Pass Project would not generate population growth. There would be no impact. No mitigation is required.

Operation and Maintenance

Operation and maintenance of the Patterson Pass Project would be similar to operation and maintenance of the existing EDF wind farms. Activities would be conducted year-round, with operation, monitoring, and control of wind turbines performed continuously. Operation and maintenance would require full-time, skilled workers. It is expected that these workers would be sourced from the existing pool of personnel that is employed for operation and maintenance of the existing EDF windfarms. Therefore, operation and maintenance of the Patterson Pass Project would not create new jobs and would not induce population growth or an increased demand for housing.

Project implementation would result in the construction of new service roads and electrical infrastructure. The service roads would provide access to various project facilities within the project area, including wind turbines and substations. The purpose of the new electrical infrastructure would be to transfer power generated by the turbines to the regional electrical grid. The roads and electrical infrastructure would be privately owned and would neither extend offsite nor provide convenient connection points for potential offsite development. Therefore, any new infrastructure within the project area would not encourage new development or induce population growth.

The Patterson Pass Project would allow for generation of electricity for distribution to the electrical grid. The generation of wind energy is necessary to meet the legal requirement for investor-owned utilities, electric service providers, and community choice aggregators to procure 33% of energy from renewable sources by 2020. The Patterson Pass Project would repower the existing first- and second-generation turbines with current-generation turbines. Because repowering would result in a slight decrease of the existing 21.8 MW nameplate capacity of the Patterson Pass Project, it is not considered growth-inducing. There would be no impact. No mitigation is required.

Impact POP-2a-1: Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere—program Alternative 1: 417 MW (no impact)

The program area is currently developed as a windfarm with some scattered rural residences and commercial sites. Program implementation would not include the demolition or displacement of any existing housing. There would be no impact.

Impact POP-2a-2: Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere—program Alternative 2: 450 MW (no impact)

The program area is currently developed as a windfarm with some scattered rural residences and commercial sites. Program implementation would not include the demolition or displacement of any existing housing. There would be no impact.

Impact POP-2b: Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere—Golden Hills Project (no impact)

The Golden Hills project area is currently developed as a windfarm, with some scattered rural residences. The project would not include the demolition or displacement of any existing housing. There would be no impact.

Impact POP-2c: Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere—Patterson Pass Project (no impact)

The Patterson Pass project area is currently developed as a windfarm. Because no housing exists on the project site, the project would not include the demolition or displacement of any existing housing. There would be no impact.

Impact POP-3a-1: Displace a substantial number of people, necessitating the construction of replacement housing elsewhere—program Alternative 1: 417 MW (no impact)

The program area is currently developed as a wind farm with some scattered rural residences and commercial sites. Because there would be no demolition of any housing, program implementation would not displace any people. There would be no impact.

Impact POP-3a-2: Displace a substantial number of people, necessitating the construction of replacement housing elsewhere—program Alternative 2: 450 MW (no impact)

The program area is currently developed as a wind farm with some scattered rural residences and commercial sites. Because there would be no demolition of any housing, program implementation would not displace any people. There would be no impact.

Impact POP-3b: Displace a substantial number of people, necessitating the construction of replacement housing elsewhere—Golden Hills Project (no impact)

The Golden Hills project area is currently developed as a windfarm with some scattered rural residences. Because there would be no demolition of any housing, the project would not displace any people. There would be no impact.

Impact POP-3c: Displace a substantial number of people, necessitating the construction of replacement housing elsewhere—Patterson Pass Project (no impact)

The Patterson Pass project area is currently developed as a wind farm. Because no housing exists in the project area, the project would not displace any people. There would be no impact.

3.12.3 References Cited

Alameda County. 2000. *East County Area Plan*. Adopted May 1994. Oakland, CA. Modified by passage of Measure D, effective December 22, 2000.

Association of Bay Area Governments. 2009. *Projections 2009: Alameda County*. Microsoft Excel spreadsheet.

———. 2010. *Bay Area Census: Alameda County*. Available: www.bayareacensus.ca.gov/counties/AlamedaCounty.htm. Accessed: May 15, 2013.

———. 2013. *Regional Housing Need Plan for the San Francisco Bay Area: 2014–2022*. Available: http://www.abag.ca.gov/planning/housingneeds/pdfs/2014-22_RHNA_Plan.pdf. Accessed: January 28, 2014.

California Employment Development Department. 2013. *Alameda County Profile*. Available: http://www.labormarketinfo.edd.ca.gov. Accessed: June 28, 2013.

———. 2012. *2010–2020 Occupations with the Most Job Openings: Oakland-Fremont-Hayward Metropolitan Divisions (Alameda and Contra Costa Counties)*. September 28.

3.13 Public Services

This section describes the regulatory and environmental setting for public services. It also describes the impacts on public services that would result from implementation of the program and two individual projects and mitigation for significant impacts where feasible and appropriate.

3.13.1 Existing Conditions

Regulatory Setting

Federal

There are no relevant federal regulations for public facilities and services.

State

There are no relevant state regulations for public facilities and services.

Local

Alameda County

East County Area Plan

The Public Services and Facilities Element and the Environmental Health and Safety Elements of the ECAP contain goals, policies, and programs related to fire protection and police services. The following goals, policies and programs are applicable to the proposed project (Alameda County 2000:62, 76).

> **Goal:** To ensure the prompt and efficient provision of police, fire, and emergency medical facility and service needs.
>
> > **Policy 241:** The County shall provide effective law enforcement, fire, and emergency medical services to unincorporated areas.
> >
> > **Policy 242:** The County shall reserve adequate sites for sheriff, fire, and emergency medical facilities in unincorporated locations within East County.
>
> **Goal:** To minimize the risk to lives and property due to fire hazards.
>
> > **Policy 324:** The County shall require the use of fire resistant building materials, fire-resistant landscaping, and adequate clearance around structures in "high" and "very high" fire hazard areas.

Environmental Setting

Fire Protection

The Alameda County Fire Department provides fire protection services to the program area in coordination with the California Department of Forestry and Fire Protection (CalFire). CalFire has responsibility for fire protection and suppression activities within State-designated high fire hazard severity zones known as State Responsibility Areas. The program area lies within areas mapped as

"Moderate" and "High" Fire Hazard Severity Zones by CalFire (California Department of Forestry and Fire Protection 2007). The nearest CalFire facility is Station 26 (Castle Rock) at 16502 Schulte Road in Tracy. CalFire responded to approximately eight fires in 2011 and four fires in 2012 related to wind turbines in the portion of the Altamont Pass within Alameda County (Giambrone pers. comm.). Although the APWRA is under CAL FIRE jurisdiction, the Alameda County Fire Department (ACFD) would also respond to any wildland fire in the program area. Stations 20 and 8 are the two ACFD stations closest to the program area. Station 20 is located at the Lawrence Livermore Laboratory at 7000 East Avenue in Livermore, approximately 3 miles from the program area's western boundary. Additional information on fire protection in the program area is in Section 3.8 *Hazards and Hazardous Materials*.

Law Enforcement

The Alameda County Sheriff's Office provides law enforcement services to unincorporated areas of Alameda County. The station with responsibility for the program area is the Tri-Valley Sub Station at 5320 Broder Boulevard in Dublin. Theft is the most common crime in the Altamont pass area, the theft of copper related to wind turbines and tools that are stored and used to repair wind turbines in particular. Since 2007, the Alameda County Sheriff's Office has seen over $5,000,000 in copper theft from the Altamont pass area. In the 6-month period of January–June 2013, the Tri-Valley Sub Station has received approximately 20 calls regarding theft incidents in the program area (Kelly pers. comm.).

Schools

The program area is in the Livermore Valley Joint Unified School District. However, no school facilities are located within the program area. The nearest school to the program area is Mountain House Elementary (3950 Mountain House Road, Byron), approximately 0.48 miles east of the APWRA. San Joaquin Delta College (2073 South Central Parkway) is approximately 0.5 miles east of the program area boundary.

Parks

Alameda County contains numerous recreational facilities, including regional preserves, parks and other open space areas. Several such areas provide recreational opportunities in the program area. Park and recreational facilities are discussed in Section 3.15, *Recreation*.

Libraries

The program area is in the Alameda County Libraries system, which has 10 locations throughout the County. There are no libraries in the program area. The nearest County library is the Livermore Public Library in the city of Livermore at 1188 S Livermore Ave.

3.13.2 Environmental Impacts

Methods for Analysis

Identifying the program's impacts on public services involved a review of the Alameda County General Plan, ECAP and the CalFire Hazard Severity Zone Map, as well as contacting local fire department and law enforcement officials to discuss the existing conditions and potential effects of the proposed program. Because no other public facilities (e.g., libraries,) exist in the program area, they are not discussed below.

Determination of Significance

In accordance with Appendix G of the State CEQA Guidelines, program Alternative 1, program Alternative 2, the Golden Hills project, or the Patterson Pass project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:
  - Fire protection
  - Police protection
  - Schools
  - Parks
  - Other public facilities

Impacts and Mitigation Measures

Impact PS-1a-1: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: fire protection; police protection; schools; parks; other public facilities—program Alternative 1: 417 MW (no impact)

Fire Protection

CalFire provides fire protection services to the program area. The fire protection facilities and infrastructure required to protect the proposed facilities and employees are already in place and would not change as a result of the proposed program. Program Alternative 1 would result in a net reduction of turbines and related infrastructure in the program area. As a result, fewer wind energy facility components could be threatened by fire or cause a fire. CalFire indicated that the newer generation of wind turbines were safer than the original models that exist in the area (Giambrone pers. comm.). All of the workers that would be employed during construction and operations are expected to reside locally or regionally and therefore are a part of the existing demand on fire protection services. The proposed program would not result in the need for new or altered fire protection facilities, such as a new or expanded fire station. There would be no impact. No mitigation is required. See Section 3.8, *Hazards and Hazardous Materials*, for a discussion of wildland fire impacts.

Law Enforcement

The Alameda County Sheriff's Office provides law enforcement services to the program area. Theft of copper, tools, and other parts is the most common crime in the program area. The police protection facilities and infrastructure required to protect the program area are already in place and serve to protect the existing wind energy facilities. The existing area is secured with perimeter fencing and locked gates. Replacing the older turbines with newer turbines is not anticipated to increase theft or other crime in the program area (Kelly pers. comm.). The construction and operations workers are anticipated to be from the local and regional workforce, and therefore already part of the existing demand on police services. Therefore, the proposed program would not require additional police staffing or facilities. There would be no impact. No mitigation is required.

Schools

No schools are present in the program area. No residential uses are proposed as part of the proposed program, and the proposed program would not result in new, permanent jobs that would bring new residents to the area. Therefore no new students would be generated. Temporary and permanent employees are assumed to reside locally and regionally and their school-aged children are assumed to be part of the existing or anticipated student population. Therefore, implementation of program Alternative 1 would not require the construction or expansion of school facilities. There would be no impact. No mitigation is required.

Parks

There are several regional parks and other open space areas within the vicinity. These facilities are intended to serve a large segment of the regional population. Residential uses are not proposed as part of program Alternative 1, and implementing this alternative would not result in new, permanent jobs that would bring new residents to the area; thus no direct increase in the number of park users is expected to result from the proposed program. It is anticipated that temporary and permanent employees would already reside locally and regionally, and so would be part of the existing demand on park facilities. There would be no impact. No mitigation is required. Parks are discussed in more detail in Chapter 3.15, *Recreation*.

Impact PS-1a-2: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: fire protection; police protection; schools; parks; other public facilities—program Alternative 2: 450 MW (no impact)

Fire Protection

CalFire provides fire protection services to the program area. The fire protection facilities and infrastructure required to protect the proposed facilities and employees are already in place and would not change as a result of the proposed program. Program Alternative 2 would result in a net reduction of turbines and related infrastructure in the program area. As a result, fewer wind energy facility components could be threatened by fire or cause a fire. CalFire indicated that the newer generation of wind turbines were safer than the original models that exist in the area (Giambrone pers. comm.). All of the workers that would be employed during construction and operations are expected to reside locally and regionally and therefore are a part of the existing demand on fire protection services. The proposed program would not result in the need for new or altered fire protection facilities, such as a new or expanded fire station. There would be no impact. No mitigation is required. See Section 3.8, *Hazards and Hazardous Materials*, for a discussion of wildland fire impacts.

Law Enforcement

The Alameda County Sheriff's Office provides law enforcement services to the program area. Theft of copper, tools, and other parts is the most common crime in the program area. The police protection facilities and infrastructure required to protect the program area are already in place and serve to protect the existing wind energy facilities. The existing area is secured with perimeter fencing and locked gates. Replacing the older turbines with newer turbines is not anticipated to increase theft or other crime in the program area (Kelly pers. comm.). The construction and operations workers are anticipated to be from the local and regional workforce, and therefore already part of the existing demand on police services. Therefore, the proposed program would not require additional police staffing or facilities. There would be no impact. No mitigation is required.

Schools

No schools are present in the program area. No residential uses are proposed as part of the proposed program, and the proposed program would not result in new, permanent jobs that would bring new residents to the area. Therefore no new students would be generated. Temporary and permanent employees are assumed to reside locally and regionally and their school-aged children are assumed to be part of the existing or anticipated student population. Therefore, implementation of program Alternative 2 would not require the construction or expansion of school facilities. There would be no impact. No mitigation is required.

Parks

There are several regional parks and other open space areas within the vicinity. These facilities are intended to serve a large segment of the regional population. Residential uses are not proposed as part of program Alternative 2, and implementing this alternative would not result in new, permanent jobs that would bring new residents to the area; thus no direct increase in the number of park users is expected to result from the proposed program. It is anticipated that temporary and permanent employees would already reside locally and regionally, and so would be part of the existing demand on park facilities. There would be no impact. No mitigation is required. Parks are discussed in more detail in Chapter 3.15, *Recreation*.

Impact PS-1b: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: fire protection; police protection; schools; parks; other public facilities—Golden Hills Project (no impact)

Fire Protection

CalFire provides fire protection services to the Golden Hills Project area. The fire protection facilities and infrastructure required to protect the proposed facilities and employees are already in place and would not change as a result of the proposed project. The program, including the Golden Hills Project, would result in a net reduction of turbines and related infrastructure in the program area. As a result, fewer wind energy facility components could be threatened by fire or cause a fire.

CalFire indicated that the newer generation of wind turbines were safer than the original models that exist in the area (Giambrone pers. comm.). All of the workers that would be employed during construction and operations are expected to reside locally or regionally and therefore part of the existing demand on fire protection services. The proposed program would not result in the need for new or altered fire protection facilities, such as a new or expanded fire station. There would be no impact. No mitigation is required. See Section 3.8 *Hazards and Hazardous Materials*, for a discussion of wildland fire impacts.

Law Enforcement

The Alameda County Sherriff's Office provides law enforcement services to the program area. Theft of copper and parts/equipment is the largest law enforcement issue in the project area. Onsite mobile trailers would be located within the staging areas to support workforce needs and site security. The proposed project would be located entirely on private property and public property with restricted public access. Only individuals with authorized access privileges would be allowed in the proposed project area. The project area is fenced and the collector substations would be fenced with a chain-link fence to prevent public access. Vegetation clearance would be maintained adjacent to the project area ingress and egress points, and around the collector substations, transformers, and interconnection riser poles to deter unauthorized access to these areas. O&M staff would also be onsite to provide security.

Replacing the older turbines with newer turbines is not anticipated to increase theft or other crime in the program area (Kelly pers. comm.). The construction and operations workers are anticipated to reside locally and regionally and therefore already part of the existing demand on police services. Therefore, the proposed project would not require additional police staffing or facilities. There would be no impact. No mitigation is required.

Schools

No schools are present in the project area. No residential uses are proposed as part of the Golden Hills Project, and the proposed project would not result in new, permanent jobs that would bring new residents to the area. Therefore, no new students would be generated. Temporary and permanent employees are assumed to reside locally and regionally and their school-aged children are assumed to be part of the existing or anticipated student population. Therefore, implementation of the Golden Hills Project would not require the construction or expansion of school facilities and no impact would occur. No mitigation is required.

Parks

There are several regional parks and other open space areas near the project area. These facilities are intended to serve a large segment of the regional population. Residential uses are not proposed as part of the Golden Hills Project and the proposed project would not result in new, permanent jobs that would bring new residents to the area. Therefore, no direct increase in the number of park users is expected to result. It is anticipated that temporary and permanent employees would already reside locally and regionally, and so would be part of the existing demand on park facilities. There would be no impact. No mitigation is required. Parks are discussed in more detail in Section 3.15, *Recreation*.

Impact PS-1c: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: fire protection; police protection; schools; parks; other public facilities—Patterson Pass Project (no impact)

Fire Protection

CalFire provides fire protection services to the Patterson Pass Project area. The fire protection facilities and infrastructure required to protect the proposed facilities and employees are already in place and would not change as a result of the proposed project. The program, including the Patterson Pass Project, would result in a net reduction of turbines and related infrastructure in the program area. As a result, fewer wind energy facility components could be threatened by fire or cause a fire. CalFire indicated that the newer generation of wind turbines were safer than the original models that exist in the area (Giambrone pers. comm.). All of the workers that would be employed during construction and operations are expected to reside locally or regionally and therefore part of the existing demand on fire protection services. The proposed program would not result in the need for new or altered fire protection facilities, such as a new or expanded fire station. There would be no impact. No mitigation is required. See Section 3.8 *Hazards and Hazardous Materials*, for a discussion of wildland fire impacts.

Law Enforcement

The Alameda County Sherriff's Office provides law enforcement services to the program area. Theft of copper and parts/equipment is the largest law enforcement issue in the Project area. Replacing the older turbines with newer turbines is not anticipated increase theft crime, or other crime, in the program area (Kelly pers. comm.). The construction and operations workers are anticipated to reside locally or regionally and therefore already part of the existing demand on police services. Therefore, the proposed project would not require additional police staffing or facilities. There would be no impact. No mitigation is required.

Schools

No schools are present in the project area. No residential uses are proposed as part of the Patterson Pass Project, and the proposed project would not result in new, permanent jobs that would bring new residents to the area. Therefore, no new students would be generated. Temporary and permanent employees are assumed to reside locally and regionally and their school-aged children are assumed to be part of the existing or anticipated student population. Therefore, implementation of the Patterson Pass Project would not require the construction or expansion of school facilities and no impact would occur. No mitigation is required.

Parks

There are several regional parks and other open space areas near the project area. These facilities are intended to serve a large segment of the regional population. Residential uses are not proposed as part of the Patterson Pass Project and the proposed project would not result in new, permanent jobs that would bring new residents to the area. Therefore, no direct increase in the number of park users is expected to result. It is anticipated that temporary and permanent employees would already reside locally and regionally, and so would be part of the existing demand on park facilities. There would be no impact. No mitigation is required. Parks are discussed in more detail in Chapter 3.14, *Recreation*.

3.13.3 References Cited

Printed References

Alameda County. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

California Department of Forestry and Fire Protection. 2007. *Adopted Fire Hazard Severity Zone Maps for State Responsibility Areas.* November 7.

Personal Communications

Giambrone, Bryan. Fire Captain at Morgan Hill Headquarters, Santa Clara Unit. CalFire, California. July 2, 2013—telephone conversation with Lindsay Christensen, ICF International.

Kelly, Ray. Police Sergeant at Tri-Valley Substation. Alameda County Sheriff's Office, California. July 2, 2013—telephone conversation with Lindsay Christensen, ICF International.

3.14 Recreation

This section describes the regulatory and environmental setting for recreation resources in the program and individual project areas. It also describes impacts on these resources that could result from implementation of the program and the two individual projects.

3.14.1 Existing Conditions

Regulatory Setting

Federal

There are no relevant federal regulations for recreation.

State

There are no relevant state regulations for recreation.

Local

Alameda County

Countywide Recreation Plan

The Recreation Plan, one of the County-wide elements of the General Plan, was adopted in June 1956 and last amended in May 1994. The Recreation Plan provides a guide for private and public acquisition and development of recreation areas and facilities. It contains general planning objectives related to promote and preserve recreational opportunities throughout the County.

East County Area Plan

The Public Services and Facilities Element contains goals, policies, and programs to ensure the development of local and regional parks throughout the East County Area. The Land Use Element contains various goals, policies and programs regarding Sensitive Lands and Regionally Significant Open Space that apply to recreation that include the following (Alameda County Community Development Agency 2000:18, 20).

Goal: To protect regionally significant open space and agricultural land from development.

Policy 52: The County shall preserve open space areas for the protection of public health and safety, provision of recreational opportunities, production of natural resources (e.g., agriculture, windpower, and mineral extraction), protection of sensitive viewsheds, preservation of biological resources, and the physical separation between neighboring communities.

Policy 54: The County shall approve only open space, park, recreational, agricultural, limited infrastructure, public facilities (e.g., limited infrastructure, hospitals, research facilities, landfill sites, jails, etc.) and other similar and compatible uses outside the Urban Growth Boundary.

Policy 70: The County shall work with the East Bay Regional Park District (EBRPD), the Livermore Area Recreation and Park District (LARPD), and other relevant agencies to ensure that open space trails adjacent to San Joaquin, Contra Costa, and Santa Clara Counties connect with trail systems in these other counties.

East Bay Regional Park District Master Plan

The 1997 *East Bay Regional Park District Master Plan* (Master Plan) is a policy document that guides the East Bay Regional Park District (EBRPD) in future expansion of parks, trails, and services for its regional parks in Contra Costa and Alameda Counties (East Bay Regional Park District 2013). The Master Plan includes policies for conserving natural and cultural resources; providing for recreational opportunities; and providing for the balanced distribution, acquisition, protection, restoration, management, and development of the regional parks. The EBRPD Board of Directors recently approved the 2013 Master Plan and 2013 Master Plan Map (East Bay Regional Park District 2013). The 2013 Master Plan Map identifies the current system of regional parks, open spaces, and trails.

Environmental Setting

Alameda County contains numerous recreational facilities, including major parks and open space areas, local parks, and private recreational facilities. Several such areas provide recreational opportunities within and in the vicinity of the program area. The program area is in the eastern portion of the county in the AWRA. The program area is characterized by rolling hills, few trees, and grazing land. Parks and trails are shown on Figure 3.1-2.

Regional Trails

The EBRPD Master Plan map identifies several regional trails within the program area (East Bay Regional Park District 2013).

- Brushy Peak to Del Vale.
- San Joaquin to Shadow Cliffs.
- Brushy Peak to Bethany Reservoir.
- Vasco Caves to Brushy Peak.

Regional Preserves and Recreation Areas

A portion of the Tesla Future Regional Preserve is in the southeast portion of the program area, along the Alameda County border. A portion of the Vasco Hills Regional Preserve is also located in the northwestern portion of the program area.

Bethany Reservoir is in the northeast portion of the program area. The reservoir is a place for water-oriented recreation such as wind surfing and fishing, and also contains a bike trail along the California Aqueduct Bikeway (California Department of Parks and Recreation 2013). It is considered a potential Regional Recreation Area (East Bay Regional Park District 2013).

3.14.2 Environmental Impacts

Methods for Analysis

Identifying the proposed program's impact on recreational resources involved a review of the Alameda County General Plan policies and the EBRPD Master Plan.

Determination of Significance

In accordance with Appendix G of the State CEQA Guidelines, program Alternative 1, program Alternative 2, the Golden Hills project, or the Patterson Pass project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.
- Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

Impacts and Mitigation Measures

Impact REC-1a-1: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated—program Alternative 1: 417 MW (no impact)

There are no existing neighborhood parks within or in the vicinity of the program area. Existing regional parks and other recreational facilities in the vicinity of the program area would not be affected because program Alternative 1 would not involve new potential users of parks or other recreational facilities. Construction workers are presumed to reside locally or regionally and are therefore among the existing users of available facilities. The operations and maintenance workforce at the site would be the same for program Alternative 1 as for the existing wind energy operations. No additional permanent employees would be required. This alternative is not anticipated to increase the use of existing parks or other recreational facilities such that substantial physical deterioration would occur or be accelerated. There would be no impact.

Impact REC-1a-2: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated—program Alternative 2: 450 MW (no impact)

There are no existing neighborhood parks within or in the vicinity of the program area. Existing regional parks and other recreational facilities in the vicinity of the program area would not be affected because program Alternative 2 would not involve new potential users of parks or other recreational facilities. Construction workers are presumed to reside locally or regionally and are therefore among the existing users of available facilities. The operations and maintenance workforce at the site would be the same for program Alternative 2 as for the existing wind energy operations. No additional permanent employees would be required. This alternative is not anticipated to increase the use of existing parks or other recreational facilities such that substantial physical deterioration would occur or be accelerated. There would be no impact.

Impact REC-1b: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated—Golden Hills Project (no impact)

There are no existing neighborhood parks on site or in the vicinity of the Golden Hills Project. Existing regional parks and other recreational facilities in the vicinity of the project area would not be affected because the Golden Hills Project would not involve new potential users of parks or other recreational facilities. Construction workers are presumed to reside locally or regionally and are therefore among the existing users of available facilities. The operations and maintenance workforce at the site would be the same for the Golden Hills Project as for the existing wind energy operations. No additional permanent employees would be required. The Golden Hills Project is not anticipated to increase the use of existing parks or other recreational facilities such that substantial physical deterioration would occur or be accelerated. There would be no impact.

Impact REC-1c: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated—Patterson Pass Project (no impact)

There are no existing neighborhood parks on site or in the vicinity of the Patterson Pass Project. Existing regional parks and other recreational facilities in the vicinity of the Patterson Pass Project would not be affected because the Patterson Pass Project would not involve new potential users of parks or other recreational facilities. Construction workers are presumed to reside locally or regionally and are therefore among the existing users of available facilities. The operations and maintenance workforce at the site would be the same for the Patterson Pass Project as for the existing wind energy operations. No additional permanent employees would be required. The Patterson Pass Project is not anticipated to increase the use of existing parks or other recreational facilities such that substantial physical deterioration would occur or be accelerated. There would be no impact.

Impact REC-2a-1: Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment—program Alternative 1: 417 MW (no impact)

Program Alternative 1 would not include recreational facilities. It would not require the construction of new or expansion of existing recreational facilities because implementing Alternative 1 would not generate a significant number of new users of such facilities (described above under Impact REC-1a-1). Construction workers are presumed to reside locally or regionally and are therefore among the existing users of existing recreational facilities. Operation and maintenance activities would be similar to existing activity. Because implementing this alternative would not result in an increase in demand for recreational facilities, no new recreational facilities would need to be developed or provided that could have a physical effect on the environment. There would be no impact.

Impact REC-2a-2: Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment—program Alternative 2: 450 MW (no impact)

Program Alternative 2 would not include recreational facilities. It would not require the construction of new or expansion of existing recreational facilities because implementing Alternative 2 would not generate a significant number of new users of such facilities (described above under Impact REC-1a-2). Construction workers are presumed to reside locally or regionally and are therefore among the existing users of existing recreational facilities. Operation and maintenance activities would be similar to existing activity. Because implementing this alternative would not result in an increase in demand for recreational facilities, no new recreational facilities would need to be developed or provided that could have a physical effect on the environment. There would be no impact.

Impact REC-2b: Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment—Golden Hills Project (no impact)

The Golden Hills Project would not include recreational facilities. It would not require the construction of new or expansion of existing recreational facilities because the proposed project would not generate a significant number of new users of such facilities (described above under impact REC-1b). Construction workers are presumed to reside locally or regionally and are therefore among the existing users of existing recreational facilities. Operation and maintenance activities would be similar to existing activity. Because the Golden Hills Project would not result in an increase in demand for recreational facilities, no new recreational facilities would need to be developed or provided that could have a physical effect on the environment. There would be no impact.

Impact REC-2c: Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment—Patterson Pass Project (no impact)

The Patterson Pass Project would not include recreational facilities. It would not require the construction of new or expansion of existing recreational facilities because the Patterson Pass Project would not generate a significant number of new users of such facilities (described above under impact REC-1c). Construction workers are presumed to reside locally or regionally and are therefore among the existing users of existing recreational facilities. Operation and maintenance activities would be similar to existing activity. Because the Patterson Pass Project would not result in an increase in demand for recreational facilities, no new recreational facilities would need to be developed or provided that could have a physical effect on the environment. There would be no impact.

3.14.3 References Cited

Alameda County. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

California Department of Parks and Recreation. 2013. *Bethany Reservoir SRA*. Available: http://www.parks.ca.gov/?page_id=562. Accessed June 26, 2013.

East Bay Regional Park District. 2013. *The District Master Plan*. Available: http://www.ebparks.org/planning/mp. Accessed: June 26, 2013; August 9, 2013.

3.15 Transportation/Traffic

This section describes the environmental setting and regulatory setting for transportation and traffic. It also describes the transportation and traffic impacts that would result from implementation of the program and two individual projects, and mitigation measures that would reduce these impacts where feasible and appropriate.

3.15.1 Existing Conditions

Regulatory Setting

Federal and State

Caltrans is responsible for operating and maintaining all State-owned roadways and interstate highways in California. The California Vehicle Code Division 15 gives Caltrans discretionary authority to issue special permits for the movement of vehicles/loads exceeding statutory limitations on the size, weight, and loading of vehicles. A special permit issued by Caltrans is required to authorize the operation of oversize or overweight trucks, both of which would be required for implementation of the repower program and the subject projects.

Local

Alameda County's ECAP (Alameda County 2000) contains goals and policies to maintain an efficient circulation network in the eastern portion of the county. Goals include creating and maintaining a balanced multimodal transportation system, cooperating with other regional transportation planning agencies, integrating pedestrian use into the transportation system, and mitigating exceedances of level of service (LOS) standards. According to Policy 193, the traffic LOS standard for major intercity arterials is LOS D. The LOS standard adopted by the Alameda County Transportation Commission (CTC), the County's Congestion Management Agency (CMA), for the Congestion Management Program (CMP) and Metropolitan Transportation System (MTS) roadways segments (e.g. I-580, I-680, and SR 84) is LOS E.

LOS standards and travel demand measures, established by the Alameda CTC, are intended to regulate long-term traffic impacts associated with future development, and do not apply to temporary construction projects whose short-term traffic increases end when construction activities end.

Alameda County has not designated local truck routes nor adopted specific policies regarding management of construction activities. Chapter 12.08 of the Alameda County Code regulates roadway use, including issuance of encroachment permits for work within an Alameda County road right-of-way.

Alameda County General Plan

The Alameda County General Plan consists of three area plans that contain the Land Use and Circulation elements for their respective geographic areas, as well as area specific goals, policies and actions for circulation, open space, conservation, safety, and noise. In addition, the General Plan contains Housing, Conservation, Open Space, Noise, Seismic and Safety, and Scenic Route elements that contain goals, policies, and actions that apply to the entire unincorporated area (Alameda County 2013). Other than the Scenic Route goals and policies that are discussed in Section 3.1, *Aesthetics*, there are no countywide circulation policies related to transportation or traffic issues pertinent to the proposed program and the subject projects. Countywide transportation plans, such as the Countywide Transportation Plan, and policies are primarily developed and maintained by the Alameda CTC, which serves as the County's CMA.

Alameda County East County Area Plan

The Alameda County ECAP contains goals and policies pertinent to transportation and traffic issues on land use involving windfarms and on the area's transportation systems involving general transportation topics, transportation demand management, streets and highways, bicycle and pedestrian paths, and aviation (Alameda County 2000:43, 50–56). Goals in the ECAP are intended to be general statements of a condition Alameda County wants to achieve, and the associated policies are the focused statements of how the County will achieve these goals. The goals and policies listed below are considered relevant to the repower program and the subject projects.

Land Use—Windfarms

Goal: To maximize the production of wind generated energy.

Policy 170: The County shall protect nearby existing uses from potential traffic, noise, dust, visual, and other impacts generated by the construction and operation of windfarm facilities.

Transportation Systems—General Transportation

Goal: To create and maintain a balanced, multi-modal transportation system that provides for the efficient and safe movement of people, goods, and services.

*__Policy 179:__ The County shall adhere to provisions of the Regional Transportation Plan, Countywide Transportation Plan, and County Congestion Management Program, insofar as they are not inconsistent with the Initiative.

Transportation Systems—Transportation Demand Management

Goal: To reduce East County traffic congestion.

Policy 183: The County shall seek to minimize traffic congestion levels throughout the East County street and highway system.

Policy 184: The County shall seek to minimize the total number of Average Daily Traffic (ADT) trips throughout East County.

Policy 185: The County shall seek to minimize peak hour trips by exploring new methods that would discourage peak hour commuting and single vehicle occupancy trips.

Policy 187: The County shall monitor traffic levels according to East County Area Plan and Congestion Management Program objectives.

Policy 188: The County shall promote the use of transit, ridesharing, bicycling, and walking, through land use planning as well as transportation funding decisions.

Policy 190: The County shall require new non-residential developments in unincorporated areas to incorporate Transportation Demand Management (TDM) measures and shall require new residential developments to include site plan features that reduce traffic trips such as mixed use development and transit-oriented development projects.

Policy 191: The County shall work with cities and the Congestion Management Agency to coordinate land use impact analyses.

Transportation Systems—Streets and Highways

Goal: To complete County-planned street and highway improvements that are attractively designed to integrate pedestrian and vehicle use.

Policy 192: The County shall work with Caltrans to improve the interstate and state highway systems and the County road system according to the street classifications shown on the East County Area Plan Transportation Diagram (see Figure 6), consistent with Policy 177.

Policy 193: The County shall ensure that new development pays for roadway improvements necessary to mitigate the exceedance of traffic Level of Service standards (as described below) caused directly by the development. The County shall further ensure that new development is phased to coincide with roadway improvements so that (1) traffic volumes on intercity arterials significantly affected by the project do not exceed Level of Service D on major arterial segments within unincorporated areas, and (2) that traffic volumes on Congestion Management Program (CMP) designated roadways (e.g., Interstate Highways 580 and 680 and State Highway 84) significantly affected by the project do not exceed Level of Service E within unincorporated areas. If LOS E is exceeded, Deficiency Plans for affected roadways shall be prepared in conjunction with the Congestion Management Agency. LOS shall be determined according to Congestion Management Agency adopted methodology. The County shall encourage cities to ensure that these Levels of Service standards are also met within unincorporated areas.

Transportation Systems—Bicycle and Pedestrian Paths

Goal: To include a comprehensive network of bicycle and pedestrian paths in the local and subregional transportation network.

Policy 211: The County shall create and maintain a safe, convenient, and effective bicycle system that maximizes bicycle use.

Policy 214: The County shall require that circulation and site plans for individual developments minimize barriers to access by pedestrians, the disabled, and bicycles (e.g., collectors or arterials separating schools or parks from residential neighborhoods).

Transportation Systems—Aviation

Goal: To ensure the efficient, safe, and economically beneficial operation of the Livermore Municipal Airport.

Policy 217: The County shall require that, where conflicts between a new use and the airport that could interfere with the airport's operations are anticipated, the burden of mitigating the conflicts will be the responsibility of the new use.

Alameda County Congestion Management Program

The Alameda County CMP identifies countywide strategies to respond to future transportation; on needs and procedures to reduce congestion. The CMP identifies existing and desired traffic conditions on a variety of roadways throughout the county. The only CMP-designated roadway that extends through the program area is I-580, which connects to I-680 to the west and I-205 to the east (Alameda County Transportation Commission 2013a:35, Figure 1). The 2012 LOS monitoring study revealed that segments of I-580 in the program vicinity operated at LOS F during peak hours: westbound segment from Greenville Road in the County to Portola Avenue in Livermore during the AM peak hour and eastbound segment from 1st Street in Livermore to North Flynn Road in the County during the PM peak hour (Alameda County Transportation Commission 2013b:12-16).

Alameda Countywide Transportation Plan

The Alameda Countywide Transportation Plan (CWTP) is a long-range policy document that guides transportation funding decisions for Alameda County's transportation system over a 25-year horizon. The CWTP lays out a strategy for meeting transportation needs for all users in Alameda County and includes projects and other improvements for new and existing freeways, local streets and roads, public transit (paratransit, buses, rails, ferries), as well as facilities and programs to support bicycling and walking (Alameda County Transportation Commission 2012a). The CWTP goals for the county's transportation system are as follows.

- Multimodal.
- Accessible, affordable and equitable for people of all ages, incomes, abilities and geographies.
- Integrated with land use patterns and local decision-making.
- Connected across the county, within and across the network of streets, highways and transit, bicycle and pedestrian routes.
- Reliable and efficient.
- Cost effective.
- Well maintained.
- Safe.
- Supportive of a healthy and clean environment.

These goals are then aligned with one or more performance categories and performance measurements. The plan also identifies land use and conservation development strategies.

Alameda County Bicycle and Pedestrian Master Plan for Unincorporated Areas

The Bicycle and Pedestrian Master Plan (Alameda County 2012) describes existing conditions for bicycling and walking, identifies needs for capital and program improvements to support these modes, and recommends improvement projects to enhance bicycling and walking in the unincorporated areas. High priority projects that meet the short-term needs of the communities are identified. Strategies for education, funding and implementation of the recommended projects and programs are also provided. This plan was prepared to update the previous bicycle and pedestrian documents. It provides a vision for bicycling and walking in Alameda County as important alternative transportation modes. The plan also identifies implementable projects that will contribute to a more bicycle and pedestrian-friendly environment for the unincorporated areas.

The Bicycle and Pedestrian Master Plan contains goals and policies for developing and implementing a bikeway system and pedestrian improvements that meet the County's vision for safe, attractive, and convenient opportunities for bicycling and walking for all types of trips and user groups.

Goal 1: Improve bicycle and pedestrian access and circulation for all users as a means to meet the goals of the Alameda County Unincorporated Areas Climate Action Plan.

Goal 2: Create and maintain a comprehensive system of bicycle and pedestrian facilities in the local and sub-regional transportation network in order to establish a balanced multi-modal transportation system.

Policy 2.8: Routinely maintain bicycle and pedestrian facilities and amenities.

Goal 3: Maximize the use of public and private resources for implementing bicycle and pedestrian improvements.

Goal 4: Provide a safer bicycling and walking environment

Policy 4.1: Monitor bicycle and pedestrian-involved collisions in the Unincorporated Areas and target the high incidence locations for bicycle and pedestrian improvements.

Policy 4.4: Work with law enforcement officials on education and enforcement programs that increase safety awareness of all road users for bicyclists and pedestrians and that reduce bicycle and pedestrian-involved collisions.

Goal 5: Promote land uses and urban design that support a pleasant environment for bicycling and walking.

Policy 5.2: Design new development and redevelopment projects to facilitate bicycle and pedestrian access, reduce bicycling and walking trip lengths, and avoid adverse impacts to the bicycle and pedestrian safety, access, and circulation.

Policy 5.3: Consider options for commercial and industrial development projects to include bicycle storage facilities for employees and customers, shower/locker areas, and other facilities identified in this plan for employees that commute by bicycle. This could include on-site facilities or services available through local partnerships. Encourage including bicycle parking and shower/locker areas in new construction or major remodel projects.

Policy 5.7: Require that all traffic impact studies and analyses of proposed street changes address impacts on bicycling and pedestrian transportation. Specifically, the following should be considered:

- Consistency with General Plan and the Bicycle and Pedestrian Master Plan policies;
- Impact on the existing and future Bicycle and Pedestrian Master Plan Bikeway System;
- Permanent travel pattern or access changes including the degree to which bicycle and pedestrian travel patterns are altered or restricted due to any change to the roadway network; and
- Conformity to accepted bicycle and pedestrian facility design standards and guidelines.

Goal 6: Support agency coordination for the improvement of bicycle and pedestrian access.

Environmental Setting

Roadway Network

Roadway access to the program area is provided by highways and local county roadways. Regional access is provided by I-580, a major east-west truck travel route and main throughway in eastern Alameda County that connects I-680 on the west and I-5 on the east (see Figure 1-1). The 2012 annual average daily traffic (AADT) volumes on I-580 in the program area are about 143,000 vehicles per day with about 10.4% of truck traffic (California Department of Transportation 2013). Caltrans annual average daily traffic (AADT) volumes and composition of trucks data for these routes are provided in Table 3.15-1.

Table 3.15-1. Annual Average Daily Traffic Volumes on Regional Access Roadways

Roadway Name	Segment Location	2012 AADT	2012 Truck AADT/ Percent of Total AADT
I-580, in program area	I-205—Greenville Road, Livermore	143,000	14,870/10.4%
I-580, west of Program area	Greenville Road, Livermore—I-680	142,000–214,000	7,550–20,130/4.6%–12.2%
I-580, east of Program area	I-5—I-205	21,000–31,000	3,380–5,330/12.5%–17.9%
I-205, Tracy	I-580—Junction I-5	82,000–114,000	10,560–13,680/11.3%–12.0%
I-680, Dublin	Bernal Avenue, Pleasanton—Alcosta Boulevard, San Ramon	132,000–167,000	8,750–12,690/5.3%–9.2%

Sources: California Department of Transportation 2013.

Major county roads that provide access in the program area include Vasco Road, Altamont Pass Road, and Patterson Pass Road. In addition, Dyer Road, Flynn Road, and Jess Ranch Road provide local access to the windfarms in the program area via Altamont Pass Road and Patterson Pass Road. The recent ADT volumes collated on Patterson Pass Road are about 2,700 to 3,700 vehicles per day (Alameda County Transportation Commission 2013a) and on Altamont Pass Road are about 5,850 to 10,250 vehicles per day (Alameda County Transportation Commission 2013b). The posted speed limits on Patterson Pass Road and the other county roads typically range from 45 to 50 miles per hour (mph) in the program area, with a few segments that allow up to 55 mph, or limit speeds to 40 mph. There have been 47 collisions in the last 5 years on Patterson Pass Road, which represents a relatively high rate and for which safety improvements are very desirable (Alameda County 2013). Many county roads in the vicinity have insufficient road base to support heavy, frequent truck loads (Alameda County Transportation Commission 2013b), including Patterson Pass Road. Average daily traffic volumes have been collected for some of the roads in the program area and are provided in Table 3.15-2.

Table 3.15-2. Average Daily Traffic Volumes on Local Access Roadways in Program Area

Roadway Name	Counter Location	Count Date	Direction	ADT
Patterson Pass Road	East of Greenville Road	January 2009–December 2012	Both	3,100
	East of South Flynn Road			2,700
	East of Midway Road			3,700
Altamont Pass Road	West of Greenville Road	September 2011	Westbound	5,050
			Eastbound	5,200
			Total	10,250
	West of Grant Line Road	September 2011	Westbound	3,550
			Eastbound	2,300
			Total	5,850

Source: Alameda County 2013a, 2013b.

Public Transit

There is no public transit service provided in the program area. To the west of the program area the closest bus service provided is in the incorporated Livermore area by the Livermore Amador Valley Transit Authority. East of the program area, the closest bus service is provided in the City of Tracy by the San Joaquin Regional Transit District. The Altamont Corridor Express (ACE) train is a commuter train service managed by the San Joaquin Regional Rail Commission for weekday travel between Stockton and San Jose. The ACE uses the Union Pacific Railroad (UPRR) tracks through the program area, with grade-separated crossings of I-580 and Altamont Pass Road.

Bikeway/Pedestrian Circulation

Bicycle facilities in the cities and communities of Alameda County are classified into three categories: Class I (bike paths) are described as completely separated, off-street, paved right-of-way (shared with pedestrians) paths, which exclude motor vehicle traffic; Class II (bike lanes) are striped lanes for one-way bike travel on a roadway; and Class III (bike routes) are on-street bike routes without striping. The Bicycle Master Plan, updated in 2012, uses these or similar categories to describe the bikeway network in the unincorporated areas of Alameda County (Alameda County 2012).

The only existing designated bikeway in the program area is the recreational path along the California aqueduct in the northeast portion of the program area, although the Bicycle Master Plan recommends bikeway route additions to the existing bikeway network by designation of new Class IIIC rural bike routes on Altamont Pass Road, Patterson Pass Road, North Flynn Road and South Flynn Road (Alameda County Public Works Agency 2012:3-18, Table 3-10, and 3-25, Figure3-3e) and the East Bay Regional Parks District (EBRPD) Master Plan identifies potential bike trails in the program area that would become part of a larger regional network (East Bay Regional Parks District 2013).

Planned bicycle routes in the area would typically not serve a conventional bicycle commuter function, but primarily are intended as recreational and inter-regional access routes. Notably, the area is host to several annual spring, summer and fall bicycle touring, racing and charity events that utilize these rural bike routes, such as the well-known Amgen Tour of California, various rides by cycling clubs, and the Meals on Wheels ride. In 2013, a portion of Patterson Pass Road in the program area was part of the Stage 7 Route of the Amgen Tour from Livermore to Mount Diablo (Amgen Tour of California 2013).

Air Traffic

There are four airports in the vicinity of the program area: Byron Airport is located about 2 miles north of the program area boundary; Tracy Municipal Airport is located about 6.5 miles east of the program area boundary; Meadowlark Field is located about 3 miles west of the program area boundary; and Livermore Municipal Airport is located about 7 miles west of the program area boundary.

3.15.2 Environmental Impacts

This section describes the impact analysis relating to transportation and traffic for the proposed program and the subject projects. It describes the methods used to determine the impacts of the program and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the impact discussion.

Methods for Analysis

Implementation of the proposed program, including the Golden Hills and Patterson Pass projects, would replace the existing turbines with fewer and larger turbines. Because of the earthwork volumes involved and the need for deliveries of highly-specialized materials and wind turbine components, construction would intermittently generate substantial volumes of traffic during the decommissioning and installation of wind turbines, and numerous oversize and overweight truck trips. Once the turbines are installed and in operation, maintenance needs would be limited and not substantially greater than currently required; post-construction traffic generation would be well within the capacity of the local roadway system and would not differ materially from current maintenance traffic levels. Analysis of traffic impacts therefore concentrated on construction activities.

Analysis used estimated construction traffic generation (expressed as average trips per day) to develop a qualitative evaluation of short-term impacts on the local and regional roadways in the vicinity of the program area. For the purpose of identifying traffic impacts associated with anticipated projects that could occur in the program area, a typical 80 MW repowering project, based on the review of wind repowering projects in the program vicinity, is assumed for the analysis to estimate the constriction-related vehicle trips. Based on the analysis for Vasco Wind Repowering Project (Contra Costa County 2010) in the program vicinity and data provided by the project applicants, a typical 80 MW repowering project in the program area and Golden Hills project are anticipated to generate an average of 424 vehicle trips per day (304 truck trips and 120 worker trips) during the peak months of the construction period. It is anticipated that worker trips would occur during AM and PM commute hours and truck trips would occur throughout the construction hours (assuming 8 hours per day), which would generate an average of 98 vehicle trips per hour (38 truck trips and 60 worker trips) during the peak commute hours. The Patterson Pass project, a 19.8 MW repowering project, is anticipated to generate an average of 230 vehicle trips per day (150 truck trips and 80 worker trips) during the peak months of the construction period, with an average of 59 vehicle trips per hour (19 truck trips and 40 worker trips) generated during the peak commute hours.

The average daily trip generation for a typical 80 MW repowering project in the program area and two subject projects are shown in Table 3.15-3.

Table 3.15-3. Average Daily Construction Trip Generation Assumptions

Activity	Average Vehicle Trips per Day (one-way)[a] Heavy Duty Truck	Light Duty Truck	Worker	Total
Typical Repowering Project in Program Area and Golden Hills Project				
Decommissioning	8	6	120, all construction activity	
Roads and WTG foundations construction	166	108		
WTG machines, pads, and substation materials delivery and installation	10	6		
Total	184	120	120	424
Patterson Pass Project				
Decommissioning	4	2	80, all construction activity	
Roads and WTG foundations construction	102	36		
WTG machines, pads, and substation materials delivery and installation	4	2		
Total	110	40	80	230

[a] To provide the conservative assessment, the average vehicle trips are estimated for the peak construction months.

Determination of Significance

In accordance with Appendix G of the State CEQA Guidelines, program Alternative 1, program Alternative 2, the Golden Hills project, or the Patterson Pass project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.
- Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways.
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.
- Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Impacts and Mitigation Measures

Impact TRA-1a-1: Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit or conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways—program Alternative 1: 417 MW (less than significant with mitigation)

Operations

Construction traffic associated with program Alternative 1 would be temporary. Once the new turbines are installed and in operation, maintenance needs would be limited and not substantially greater than currently required; post-construction traffic generated by the maintenance activities would be well within the capacity of the local roadway system and would not differ materially from the current maintenance traffic level. Operation of windfarms in the APWRA is consistent with the Alameda County General Plan, transportation plans, and regulations incorporating assumptions of buildout of the General Plan. Accordingly, program Alternative 1 would not conflict with applicable transportation plans, ordinances, and policies. The traffic impact associated with operation and maintenance of the Alternative 1 would be less than significant.

Construction

Construction of individual repowering projects in the program area associated with Alternative 1 would temporarily increase vehicle traffic on regional and local access routes in the project vicinity and involve the transport of oversize and overweight wind turbine components. Depending on the size of each separate repowering project, construction activities could take place over a time period lasting between 6 and 12 months. As discussed above and summarized in Table 3.15-3, a typical 80 MW repowering project in the program area is anticipated to generate an average of 424 vehicle trips per day (304 truck trips and 120 worker trips) and 98 vehicle trips per hour (38 truck trips and 60 worker trips) during the peak commute hours.

Table 3.15-4 summarizes an estimate of the construction-related trips on regional access highways in the program vicinity. The increase in construction trips is a small fraction (less than 0.5 percent) of ADT on I-580 in the program area and the regional access highways in the program vicinity; accordingly, the construction traffic is not expected to degrade traffic operation on these regional access roadways.

Table 3.15-4. Estimated Construction Trips on Regional Access Roadways—Typical Repowering Project and Golden Hills Project

Roadway Name	Description	2012 AADT	2012 Truck AADT/Percent of Total AADT	Average Daily Construction Trips/Percent of Total AADT	Average Daily Construction Trick Trips/Percent of Total AADT
I-580, in program area	I-205—Greenville Road, Livermore	143,000	14,870/10.4%	212[a]/0.1%	152[a]/0.1%
I-580, west of Program area	Greenville Road, Livermore—I-680	142,000–214,000	7,550–20,130/ 4.6%–12.2%	212[a]/0.1%	152[a]/0.1%
I-580, east of Program area	I-5—I-205	21,000–31,000	3,380–5,330/ 12.5%–17.9%	106[b]/0.5%	76[b]/0.2%–0.4%
I-205, Tracy	I-580—Junction I-5	82,000–114,000	10,560–13,680/ 11.3%–12.0%	106[b]/0.1%	76[b]/< 0.1%
I-680, Dublin	Bernal Avenue, Pleasanton—Alcosta Boulevard, San Ramon	132,000–167,000	8,750–12,690/ 5.3%–9.2%	53[c]/< 0.1%	38[c]/< 0.1%

[a] Assumes 50 percent of total daily vehicle trips (424) and total truck trips (304) would originate from west of the program area, from the Livermore area and areas to the west, and 50 percent of the construction traffic would originate from east of the program area, from the Tracy area and areas to the east.

[b] Assumes 50 percent of the construction traffic originated from east of the program area, which is 25 percent of total construction traffic, would access the project area via I-580, and 50 percent of the construction traffic would access the project area via I-205.

[c] Assumes 50 percent of the construction traffic originated from west of the program area, which is 25 percent of total construction traffic, would be from areas west of Livermore and use I-680 to access the program area. 50 percent of the construction traffic would be from south and 50 percent of the construction traffic would be from north (12.5 percent of total construction traffic).

Construction traffic could cause a substantial traffic increase on the local county roads that provide direct access to the project construction sites—e.g., Vasco Road, Altamont Pass Road, Patterson Pass Road, Dyer Road, and Flynn Road—as these roads generally have low traffic volumes. Table 3.15-5 summarizes an estimate of the construction-related trips on major county roads that provide direct access to construction sites (Altamont Pass Road and Patterson Pass Road) in the program area. The increase in construction trips would range from 2 to 8 percent of ADT and from 5 to 18 percent of peak hour volumes on Altamont Pass Road and Patterson Pass Road. The substantial increase in construction traffic, especially during the AM and PM peak commute hours, could potentially cause degradation of traffic operation on these local project access routes. The impact from increases construction trips on the local roadway traffic operation is considered a significant impact.

However, because the construction activities would be temporary and would not cause the long-term closures or alternation of project access roads that would otherwise substantially change the circulation of surrounding roadway system and could degrade the traffic operation to an unacceptable LOS, implementation of Mitigation Measure TRA-1 would reduce the impact of increased traffic on local access roads and the impact of short-term temporary closures of travel lanes at project site access points during delivery of oversized loads to a less-than-significant level.

Table 3.15-5. Estimated Construction Trips on Local Access Roadways—Typical Repowering Project and Golden Hills Project

Roadway Name	Counter Location	Existing ADT (vpd)	Average Daily Construction Trips[a]/Percent of Total ADT	Average Peak Hour Construction Trips[a]/ Percent of Peak Hour Traffic[b]
Patterson Pass Road	East of Greenville Road	3,100	212/7%	49/15%
	East of South Flynn Road	2,700	212/8%	49/18%
	East of Midway Road	3,700	212/6%	49/13%
Altamont Pass Road	West of Greenville Road	10,250	212/2%	49/5%
	West of Grant Line Road	5,850	212/4%	49/8%

[a] Assumes construction traffic would access the construction sites either via Patterson Pass Road or via Altamont Pass Road, depending on the project locations; and 50 percent of total construction traffic (424 daily trips and 98 peak hour trips) would access the project area via either roadways from the west and 50 percent of the construction traffic would be from the east.

[b] Peak hour traffic on the roadway segments typically is assumed about 10% of ADT.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Prior to starting construction-related activities, the Applicant shall prepare and implement a Traffic Control Plan (TCP) that will reduce or eliminate impacts associated with the proposed program. The TCP shall adhere to Alameda County and Caltrans requirements, and must be submitted for review and approval of the County Public Works Department prior to implementation. The TCP shall include the following elements. The County and Caltrans may require additional elements to be identified during their review and approval of the TCP.

- Schedule construction hours to minimize concentrations of construction workers commuting to/from the project site during typical peak commute hours (7 a.m. to 9 a.m. and 4 p.m. to 6 p.m.).
- Limit truck access to the project site during typical peak commute hours (7 a.m. to 9 a.m. and 4 p.m. to 6 p.m.).
- Require that written notification be provided to contractors regarding appropriate haul routes to and from the program area, as well as the weight and speed limits on local county roads used to access the program area.
- Provide access for emergency vehicles to and through the program area at all times.
- When lane/road closures occur during delivery of oversized loads, provide advance notice to local fire, police, and emergency service providers to ensure that alternative evacuation and emergency routes are designated to maintain service response times.
- Provide adequate onsite parking for construction trucks and worker vehicles.
- Require suitable public safety measures in the program area and at the entrance roads, including fences, barriers, lights, flagging, guards, and signs, to give adequate warning to the public of the construction and of any dangerous conditions that could be encountered as a result thereof.

- Complete road repairs on local public roads as needed during construction to prevent excessive deterioration. This work may include construction of temporary roadway shoulders to support any necessary detour lanes.
- Repair or restore the road right-of-way to its original condition or better upon completion of the work.
- Coordinate program-related construction activities, including schedule, truck traffic, haul routes, and the delivery of oversized or overweight materials, with Alameda County, Caltrans, and affected cities to identify and minimize overlap with other area construction projects.

Impact TRA-1a-2: Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit or conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways—program Alternative 2: 450 MW (less than significant with mitigation)

As mentioned in Chapter 2, Projection Description, with the exception of the nameplate capacity and the resultant total number of turbines (i.e., approximately 259 turbines under Alternative 1 and 281 under Alternative 2), the two alternatives are identical. For the purpose of identifying traffic impacts associated with anticipated projects that could occur under Alternative 2, a typical 80 MW repowering project, as analyzed under Impact TRA-1a-1 for Alternative, is also assumed for the analysis. Therefore, operation and construction traffic impact of the Alternative 2 would be similar to the impact discussed for the Alternative 1 under Impact TRA-1a-1.

The traffic impact associated with operation and maintenance of the Alternative 2 would be less than significant. However, the construction traffic impact would be significant on the local county roads that provide direct access to the project area. Implementation of Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact TRA-1b: Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit or conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways—Golden Hills Project (less than significant with mitigation)

The Golden Hills Project is an 88.4 MW repowering project. Therefore, operation and construction traffic impacts of the project would be similar to (or up to 10% greater than) the impact discussed for the Alternative 1 under Impact TRA-1a-1.

The traffic impact associated with operation and maintenance of the project would be less than significant. However, the construction traffic impact would be significant on the local county roads that provide direct access to the project area. Implementation of Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact TRA-1c: Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit or conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways—Patterson Pass Project (less than significant with mitigation)

As discussed under Impact TRA-1a-1, maintenance needs of the project would be limited and not substantially greater than currently required; post-construction traffic generated by the maintenance activities would be well within the capacity of the local roadway system and would not differ materially from the current maintenance traffic level. Therefore, the traffic impact associated with operation and maintenance of the project would be less than significant.

Construction of the project would temporarily increase vehicle traffic on regional and local access routes in the project vicinity and involve the transport of oversize and overweight wind turbine components. As discussed above and summarized in Table 3.15-3, the project is anticipated to generate an average of 230 vehicle trips per day (150 truck trips and 80 worker trips) and 59 vehicle trips per hour (19 truck trips and 40 worker trips) during the peak commute hours.

Table 3.15-6 summarizes an estimate of the construction-related trips on regional access highways in the program vicinity. The increase in construction trips is a small fraction (less than 0.3 percent) of ADT on I-580 in the program area and the regional access highways in the program vicinity; accordingly, the construction traffic is not expected to degrade traffic operation on these regional access roadways.

Table 3.15-6. Estimated Construction Trips on Regional Access Roadways–Patterson Pass Project

Roadway Name	Description	2012 AADT	2012 Truck AADT/Percent of Total AADT	Average Daily Construction Trips/Percent of Total AADT	Average Daily Construction Trick Trips/Percent of Total AADT
I-580, in program area	I-205—Greenville Road, Livermore	143,000	14,870/10.4%	115[a]/< 0.1%	75[a]/< 0.1%
I-580, west of Program area	Greenville Road, Livermore—I-680	142,000–214,000	7,550–20,130/ 4.6%–12.2%	115[a]/< 0.1%	75[a]/< 0.1%
I-580, east of Program area	I-5—I-205	21,000–31,000	3,380–5,330/ 12.5%–17.9%	58[b]/0.3%	38[b]/0.1%–0.2%
I-205, Tracy	I-580—Junction I-5	82,000–114,000	10,560–13,680/ 11.3%–12.0%	58[b]/< 0.1%	38[b]/< 0.1%
I-680, Dublin	Bernal Avenue, Pleasanton—Alcosta Boulevard, San Ramon	132,000–167,000	8,750–12,690/ 5.3%–9.2%	29[c]/< 0.1%	19[c]/< 0.1%

[a] Assumes 50 percent of total daily vehicle trips (230) and total truck trips (150) would originate from west of the program area, from the Livermore area and areas to the west, and 50 percent of the construction traffic would originate from east of the program area, from the Tracy area and areas to the east.

[b] Assumes 50 percent of the construction traffic originated from east of the program area, which is 25 percent of total construction traffic, would access the project area via I-580, and 50 percent of the construction traffic would access the project area via I-205.

[c] Assumes 50 percent of the construction traffic originated from west of the program area, which is 25 percent of total construction traffic, would be from areas west of Livermore and use I-680 to access the program area. 50 percent of the construction traffic would be from south and 50 percent of the construction traffic would be from north (12.5 percent of total construction traffic).

Construction traffic could cause a substantial traffic increase on the local county roads that provide direct access to the project construction sites—e.g., Patterson Pass Road and Jess Ranch Road—as these roads generally have low traffic volumes. Table 3.15-7 summarizes an estimate of the construction-related trips on Patterson Pass Road, which provides direct access to construction sites in the project area. The increase in construction trips would range from 3 to 4 percent of ADT and from 8 to 11 percent of peak hour volumes on Patterson Pass Road. The substantial increase in construction traffic, especially during the AM and PM peak commute hours, could potentially cause degradation of traffic operation on these local project access routes. The impact from increases construction trips on the local roadway traffic operation is considered a significant impact.

However, because the construction activities would be temporary and would not cause the long-term closures or alternation of project access roads that would otherwise substantially change the circulation of surrounding roadway system and could degrade the traffic operation to an unacceptable LOS, implementation of Mitigation Measure TRA-1 would reduce the impact of increased traffic on local access roads and the impact of short-term temporary closures of travel lanes at project site access points during delivery of oversized loads to a less-than-significant level.

Table 3.15-7. Estimated Construction Trips on Local Access Roadways–Patterson Pass Project

Roadway Name	Counter Location	Existing ADT (vpd)	Average Daily Construction Trips[a]/Percent of Total ADT	Average Peak Hour Construction Trips[a]/Percent of Peak Hour Traffic[b]
Patterson Pass Road	East of Greenville Road	3,100	115/4%	30/10%
	East of South Flynn Road	2,700	115/4%	30/11%
	East of Midway Road	3,700	115/3%	30/8%

[a] Assumes construction traffic would access the construction sites either via Patterson Pass Road or via Altamont Pass Road, depending on the project locations; and 50 percent of total construction traffic (230 daily trips and 59 peak hour trips) would access the project area via either roadways from the west and 50 percent of the construction traffic would be from the east.

[b] Peak hour traffic on the roadway segments typically is assumed about 10% of ADT.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact TRA-2a-1: Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways—program Alternative 1: 417 MW (less than significant)

As discussed under TRA-1a-1, maintenance needs of the project would be limited and not substantially greater than currently required; post-construction traffic generated by the maintenance activities would be well within the capacity of the CMP roadway system and would not differ materially from the current maintenance traffic level. Therefore, the traffic impact associated with operation and maintenance of the project would be less than significant.

The increase in construction traffic, as shown in Table 3.15-4, is a small fraction (less than 0.5 percent) of ADT on I-580 in the program area and the regional CMP roadways (I-205 and I-680) in the program vicinity. Although some of the CMP roadway segments operated at LOS F (Alameda County Transportation Commission 2013b:12-16). However, the small increase in construction traffic is not expected to degrade the traffic operation of the CMP roadway segments that already exceed the LOS standard E or cause a CMP roadway segment to exceed the LOS standard. Therefore, the construction traffic impact on CMP roadways would be less than significant.

Impact TRA-2a-2: Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways—program Alternative 2: 450 MW (less than significant)

Operation and construction traffic impacts on the CMP roadway system in the program vicinity would be similar to the impact discussed for the Alternative 1 under Impact TRA-2a-1. The traffic impact on CMP roadways would be less than significant.

Impact TRA-2b: Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways—Golden Hills Project (less than significant)

Operation and construction traffic impacts on the CMP roadway system in the program vicinity would be similar to the impact discussed for the Alternative 1 under Impact TRA-2a-1. The traffic impact on CMP roadways would be less than significant.

Impact TRA-2c: Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways—Patterson Pass Project (less than significant)

Operation and construction traffic impacts on the CMP roadway system in the program vicinity would be similar to the impact discussed for the Alternative 1 under Impact TRA-1a-1. The increase in construction traffic, as shown in Table 3.15-6, is a small fraction (less than 0.3 percent) of ADT on I-580 in the program area and the regional CMP roadways (I-205 and I-680) in the program vicinity. Although some of the CMP roadway segments operated at LOS F (Alameda County Transportation Commission 2013b:12-16). However, the small increase in construction traffic is not expected to degrade the traffic operation of the CMP roadway segments that already exceed the LOS standard E or cause a CMP roadway segment to exceed the LOS standard. Therefore, the operation and construction traffic impact on CMP roadways would be less than significant.

Impact TRA-3a-1: Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks—program Alternative 1: 417 MW (less than significant)

Implementing program Alternative 1 would not affect air traffic patterns of the public and private airports in the vicinity of the program area. Additionally, this alternative would not result in substantial safety risks associated with airport operations (see airport impact discussion and FAA lighting requirements discussion in Section 3.8, *Hazards and Hazardous Materials*, under Impact HAZ-5 and Impact HAZ-6). The impact would be less than significant.

Impact TRA-3a-2: Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks—program Alternative 2: 450 MW (less than significant)

Implementing program Alternative 2 would not affect air traffic patterns of the public and private airports in the vicinity of the program area. Additionally, this alternative would not result in substantial safety risks associated with airport operations (see airport impact discussion and FAA lighting requirements discussion in Section 3.8, *Hazards and Hazardous Materials*, under Impact HAZ-5 and Impact HAZ-6). The impact would be less than significant.

Impact TRA-3b: Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks —Golden Hills Project (less than significant)

The proposed project would not affect air traffic patterns of the public and private airports in the vicinity of the project area. The proposed project also would not result in substantial safety risks associated with airport operations (see airport impact discussion and Federal Aviation Administration lighting requirements discussion in Section 3.8, *Hazards and Hazardous Materials*, under Impact HAZ-5 and Impact HAZ-6). The impact would be less than significant.

Impact TRA-3c: Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks —Patterson Pass Project (less than significant)

The proposed project would not affect air traffic patterns of the public and private airports in the vicinity of the proposed project. The proposed project also would not result in substantial safety risks associated with airport operations (see airport impact discussion and Federal Aviation Administration lighting requirements discussion in Section 3.8, *Hazards and Hazardous Materials*, under Impact HAZ-5 and Impact HAZ-6). The impact would be less than significant.

Impact TRA-4a-1: Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) due to construction-generated traffic—program Alternative 1: 417 MW (less than significant with mitigation)

The presence of large, slow-moving construction-related vehicles and equipment among the general-purpose traffic on roadways that provide access to the program area could cause other drivers to act impatiently and create traffic safety hazards. In addition, the slow-moving trucks entering or exiting the program area from public roads could pose a traffic hazard to other vehicles and increase the potential for turning movement collisions at the program area entrance intersection. The creation of potential traffic safety hazards as a result of construction trucks would be a significant impact.

Heavy truck traffic delivering equipment and materials to the program area could result in road wear and damage that result in a driving safety hazard. The degree to which this latter impact would occur depends on the existing roadway design (pavement type and thickness) and existing condition of the road. Freeways such as I-580 are designed to accommodate a mix of vehicle types, including heavy trucks, and the construction vehicle impacts are expected to be negligible on those roads. However, county roads are not designed and constructed to the same standards as the interstate highways and could be damaged by construction traffic. This impact on county roads would be significant. Implementation of Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level.

Construction associated with program Alternative 1 would require the delivery of equipment and materials, such as wind turbines, that could cause the construction trucks to exceed roadway load or size limits. To transport this equipment, the project applicant must obtain special permits from Caltrans District 4 and other relevant jurisdictions including Alameda County to move oversized or overweight materials. In addition, the applicant must ensure proper routes are followed; proper time is scheduled for the delivery; and proper escorts, including advanced warning and trailing vehicles as well as law enforcement control are available, if necessary. Therefore, compliance with required special permits, also incorporated into Mitigation Measure TRA-1, would ensure that safety hazard impacts as result of oversized or overweight trucks would be less than significant.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact TRA-4a-2: Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) due to construction-generated traffic—program Alternative 2: 450 MW (less than significant with mitigation)

The construction traffic impact on traffic safety hazards under the Alternative 2 would be similar to the impact discussed under Impact TRA-4a-1. The safety hazard impact on county roads would be significant. Implementation of Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact TRA-4b: Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment due to construction-generated traffic—Golden Hills Project (less than significant with mitigation)

Proposed project ingress/egress to the project area would be via Altamont Pass Road, Patterson Pass Road, Flynn Road, and Dyer Road. As described in Section 2.6.1, minor intersection improvements would be implemented along these roads to allow for safe passage of the oversized vehicles and facilitate ingress/egress from local access roads. Following road construction, all roads would be inspected to determine if and where any additional grading or additional gravel would be necessary to meet Alameda County road standards.

Regardless, the presence of large, slow-moving construction-related vehicles and equipment among the general-purpose traffic on roadways that provide access to the project area could cause other drivers to act impatiently and create traffic safety hazards. In addition, the slow-moving trucks entering or exiting the project area from public roads could pose a traffic hazard to other vehicles and increase the potential for turning movement collisions at the project entrance intersection. The creation of potential traffic safety hazards as a result of construction trucks would be a significant impact. Implementation of Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact TRA-4c: Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment due to construction-generated traffic—Patterson Pass Project (less than significant with mitigation)

Proposed project ingress/egress to the project area would be via Patterson Pass Road and Jess Ranch Road. As discussed in Section 2.6.2, minor intersection improvements would be implemented along these roads to allow for safe passage of the oversized vehicles and facilitate ingress/egress from local access roads. Following road construction, all roads would be inspected to determine if and where any additional grading or additional gravel would be necessary to meet Alameda County road standards.

Regardless, the presence of large, slow-moving construction-related vehicles and equipment among the general-purpose traffic on roadways that provide access to the project area could cause other drivers to act impatiently and create traffic safety hazards. In addition, the slow-moving trucks entering or exiting the project area from public roads could pose a traffic hazard to other vehicles and increase the potential for turning movement collisions at the project entrance intersection. The creation of potential traffic safety hazards as a result of construction trucks would be a significant impact. Implementation of Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact TRA-5a-1: Result in inadequate emergency access due to construction-generated traffic—program Alternative 1: 417 MW (less than significant with mitigation)

Slow-moving construction trucks could delay or obstruct the movement of emergency vehicles on program area haul routes. In addition, lane/road closures occurring during delivery of oversized loads could impair roadway capacity and increase the response time for emergency vehicles traveling through the closure area. Therefore, construction would have the potential to significantly affect emergency vehicle access. The TCP required under the Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact TRA-5a-2: Result in inadequate emergency access due to construction-generated traffic—program Alternative 2: 450 MW (less than significant with mitigation)

Construction traffic impact of the Alternative 2 would be similar to the impact discussed for the Alternative 1 under Impact TRA-5a-1. Therefore, construction would have the potential to significantly affect emergency vehicle access. The TCP required under Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact TRA-5b: Result in inadequate emergency access due to construction-generated traffic—Golden Hills Project (less than significant with mitigation)

Construction traffic impact of the proposed project would be similar to the impact discussed for the program under Impact TRA-5a-1. Therefore, construction would have the potential to significantly affect emergency vehicle access. The TCP required under Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact TRA-5c: Result in inadequate emergency access due to construction-generated traffic—Patterson Pass Project (less than significant with mitigation)

Construction traffic impact of the proposed project would be similar to the impact discussed for the program under Impact TRA-5a-1. Therefore, construction would have the potential to significantly affect emergency vehicle access. The TCP required under Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact TRA-6a-1: Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities—program Alternative 1: 417 MW (less than significant with mitigation)

No public transit services or pedestrian facilities are available on the project access routes in the program vicinity. Therefore, the maintenance and construction activities associated with windfarms in the program area would not conflict with polices, plans, or programs regarding the alternative transportation or degrade the performance of transit services and pedestrian facilities.

Most of the maintenance and construction activities associated with windfarms are contained within the specific project work sites and are not expected to result in the long-term closures of travel lanes or roadway segments, permanently alter the public access roadways, and create new public roadways that could substantially change the travel patterns of vehicles and bicycles on the surrounding roadway facilities and conflict with the policies and plans regarding bicycle facilities.

However, during the construction, slow-moving oversized trucks could potentially disrupt the movement of bicycles traveling on the shoulders along Altamont Pass Road, Patterson Pass Road, and Flynn Road in the program area and increase the safety concerns for any bicyclists who use the routes. These roadways are not the County classified bikeways, but are used as recreational and inter-regional access routes. In addition, lane/road closures occurring during delivery of oversized loads near the work site access points could temporarily disrupt the bicycle access on the roads. Therefore, construction would have the potential to significantly affect bicycle access. The traffic control plan required under the Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact TRA-6a-2: Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities—program Alternative 2: 450 MW (less than significant with mitigation)

The construction traffic impact on alternative transportation facilities (transit service, pedestrian facilities, and bicycle facilities) under the Alternative 2 would be similar to the impact discussed under Impact TRA-6a-1. The construction traffic impact on bicycle facilities would be significant. Implementation of Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact TRA-6b: Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities—Golden Hills Project (less than significant with mitigation)

The construction traffic impact on alternative transportation facilities (transit service, pedestrian facilities, and bicycle facilities) under the project would be similar to the impact discussed under Impact TRA-6a-1. The construction traffic impact on bicycle facilities would be significant. Implementation of Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact TRA-6c: Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities—Patterson Pass Project (less than significant with mitigation)

The construction traffic impact on alternative transportation facilities (transit service, pedestrian facilities, and bicycle facilities) under the project would be similar to the impact discussed under Impact TRA-6a-1. The construction traffic impact on bicycle facilities would be significant. Implementation of Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level.

Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

3.15.3 References Cited

Alameda County. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

———. 2012. *Alameda County Bicycle and Pedestrian Master Plan for Unincorporated Areas*. April. Available: http://www.acgov.org/pwa/documents/Bike-Ped-Plan-for-Unincorporated-Final.pdf. Accessed: February 7, 2014.

———. 2013. *Patterson Pass Road and Tesla Road Safety Study*. Public Meeting Presentation on March 27. Alameda County Public Works Agency. Available: http://www.acgov.org/pwa/updates/pattersonpassstudy.htm. Accessed: June 27, 2013.

Alameda County Transportation Commission. 2012a. Alameda Countywide Transportation Plan. Available: http://www.alamedactc.org/files/managed/Document/8043/ALAMEDA_CWTP_FINAL.pdf. Accessed: August 28, 2013.

———. 2012b. Alameda Countywide Bicycle Plan with Vision Network Maps, East Planning Area. Adopted October 2012. Available: http://www.alamedactc.org/files/managed/Document/10086/ACTC_Bike_East_011013.pdf. Accessed: August 19, 2013.

———. 2013a. Alameda County Congestion Management Program. October. Available: http://www.alamedactc.org/app_pages/view/5224. Accessed: February 7, 2014.

———. 2013b. 2012 Level of Service Monitoring Report. January. Available: http://www.alamedactc.org/app_pages/view/8091. Accessed: February 7, 2014.

Amgen Tour of California. 2013. *Stage 7 – Livermore to Mt Diablo*. Available: <http://www.amgentourofcalifornia.com/Route/stages/stage7.html>. Accessed: October 17, 2013.

California Department of Transportation. 2013. *2012 Traffic Volumes for All Vehicles and 2012 Truck Traffic on California State Highways*. Traffic Data Branch. Available: http://traffic-counts.dot.ca.gov/. Accessed: February 7, 2014.

Contra Costa County. 2010. *Vasco Winds Repowering Project Draft Environmental Impact Report*. December. SCH No. 2010032094. County File No. LP08-2049. Department of Conservation and Development.

East Bay Regional Parks District. 2013. 2013 Master Plan Map. July 16. Available: http://www.ebparks.org/Assets/_Nav_Categories/Park_Planning/Master+Plan/Maps/Master+Plan+Map+-+August+2013.pdf. Accessed: February 7, 2014.

3.16 Utilities and Service Systems

This section describes the regulatory and environmental setting for utilities and service systems in the program and individual project areas. It also describes impacts on utilities and service systems that would result from implementation of the program and two individual projects.

3.16.1 Existing Conditions

Regulatory Setting

Federal

Clean Water Act

Section 304 of the CWA establishes primary drinking water standards and requires states to ensure that potable water retailed to the public meets these standards. State primary and secondary drinking water standards are promulgated in 22 CCR 64431–64501. Secondary drinking water standards incorporate nonhealth risk factors including taste, odor, and appearance. The NPDES regulates the discharge of drainage to surface waters. Federal NPDES regulations are administered by the SWRCB and through the Regional Water Boards, which is the San Francisco Bay Regional Water Board in the program area. Municipal storm drainage is required to meet board standards under waste discharge regulations/NPDES permits.

State

Porter–Cologne Water Quality Control Act (Section 13000 et seq.)

The Porter–Cologne Act directs the State Water Board and Regional Water Boards to prepare Water Quality Control Plans (Basin Plans) that establish water quality objectives and beneficial uses for each body of water, including groundwater basins, within the regional boundaries. The Porter–Cologne Act empowers the State Water Board and Regional Water Boards to protect the beneficial use of California waters, thereby providing broader authority than offered by the CWA alone. The State Water Board and Regional Water Boards adopt regulations to protect surface water quality.

California Energy Commission

The California Energy Commission (CEC) regulates the provision of natural gas and electricity within the state. The CEC is the state's primary energy policy and planning agency and has five major responsibilities: forecasting future energy needs and keeping historical energy data, licensing thermal power plants 50 megawatts or larger, promoting energy efficiency through appliance and building standards, developing energy technologies and supporting renewable energy, and planning for and directing the state response to energy emergencies.

California Integrated Waste Management Board

The California Integrated Waste Management Board is the state agency designated to oversee, manage, and track California's 76 million tons of waste generated each year. It is one of the six agencies under the umbrella of the California Environmental Protection Agency. The California

Integrated Waste Management Board develops laws and regulations to control and manage waste; enforcement authority is typically delegated to the local government. The board works jointly with local government to implement regulations and fund programs.

Pursuant to the California Integrated Solid Waste Management Act of 1989, all cities in California are required to reduce the amount of solid waste disposed in landfills. Contracts that include work that will generate solid waste, including construction and demolition debris, have been targeted for participation in source-reduction, reuse, and recycling programs. Contractors are urged to manage solid waste to divert waste away from disposal in landfills (particularly Class III landfills) and to maximize source reduction, reuse, and recycling of construction and demolition debris.

Wastewater

Wastewater is regulated by the agencies listed below.

- State Water Board.
- San Francisco Regional Water Board.
- California Department of Pesticide Regulation.
- California Department of Toxic Substances.

Local

There are no local regulations that apply to the proposed program.

Environmental Setting

Water Service

The Alameda County Water District (ACWD) provides water service to the cities of Fremont, Union City, and Newark. Rural residences in eastern unincorporated Alameda County obtain water from private wells. No water service is provided at the existing windfarms.

Wastewater

No sewer/septic systems are present at the existing windfarms.

Stormwater Drainage

The program area is located entirely in a rural setting; stormwater runoff drains primarily through natural drainage swales, ditches, and watercourses. See Section 3.9, Hydrology and Water Quality, for further discussion of drainage in the project area.

Solid Waste Disposal

Two permitted, large-volume landfills are active in Alameda County: Vasco Road Landfill and the Altamont Landfill. The Vasco Road Landfill is located at 4001 North Vasco Road in Livermore. The facility accepts a variety of materials including nonhazardous industrial waste including nonfriable asbestos, contaminated soil, municipal wastewater treatment plant sludge, construction and demolition (C&D) wastes, empty containers, and other industrial and special wastes (Waste

Management n.d.). Vasco Road Landfill is estimated to have sufficient capacity through 2022 (Waste Management—Bay Area n.d.).

The Altamont Landfill is located at 10840 Altamont Pass Road in Livermore and has disposal capacity through 2045 (Contra Costa County n.d.). It accepts for disposal all nonhazardous municipal solid wastes, nonhazardous industrial and special wastes, dewatered wastewater treatment plant sludge (biosolids), treated auto shredder wastes, contaminated soils, liquids for solidification, and friable asbestos wastes (California Regional Water Quality Control Board—San Francisco Bay Region 2008:10).

3.16.2 Environmental Impacts

Methods for Analysis

Identifying the impacts of the program and proposed projects on utilities and service systems involved a review of program and project information, applicable regulations, and the ECAP.

Determination of Significance

In accordance with Appendix G of the State CEQA Guidelines, program Alternative 1, program Alternative 2, the Golden Hills project, or the Patterson Pass project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Require new or expanded entitlements to water resources.
- Result in a determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the program or proposed projects' projected demand in addition to the provider's existing commitments.
- Generate solid waste that would exceed the permitted capacity of area landfills to accommodate the project's solid waste disposal needs.
- Not comply with federal, state, and local statutes and regulations related to solid waste.

Impacts and Mitigation Measures

Impact UT-1a-1: Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board—program Alternative 1: 417 MW (less than significant)

Several portable toilets would be used during construction activities, and several portable toilets would be maintained year-round onsite. Portable toilets would be serviced by a private contractor. Program Alternative 1would not generate a significant amount of wastewater that would be treated by public wastewater treatment facilities and would not exceed the San Francisco Bay Regional

Water Board's wastewater treatment requirements. This impact would be less than significant. No mitigation is required.

Impact UT-1a-2: Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board—program Alternative 2: 450 MW (less than significant)

Several portable toilets would be used during construction activities, and several portable toilets would be maintained year-round onsite. Portable toilets would be serviced by a private contractor. Program Alternative 2 would not generate a significant amount of wastewater that would be treated by public wastewater treatment facilities and would not exceed the San Francisco Bay Regional Water Board's wastewater treatment requirements. This impact would be less than significant. No mitigation is required.

Impact UT-1b: Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board—Golden Hills Project (less than significant)

The Golden Hills Project would not generate a significant amount of wastewater that would be treated by public wastewater treatment facilities. Up to four portable toilets would be used during construction and would be serviced by a private contractor. Accordingly, the project would not generate a significant amount of wastewater that would be treated by public wastewater treatment facilities and would not exceed the San Francisco Bay Regional Water Board's wastewater treatment requirements. This impact would be less than significant. No mitigation is required.

Impact UT-1c: Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board—Patterson Pass Project (less than significant)

The Patterson Pass Project would not generate a significant amount of wastewater that would be treated by public wastewater treatment facilities. Portable toilets would be used during construction and would be serviced by a private contractor. Accordingly, the project would not generate a significant amount of wastewater that would be treated by public wastewater treatment facilities and would not exceed the San Francisco Bay Regional Water Board's wastewater treatment requirements. This impact would be less than significant. No mitigation is required.

Impact UT-2a-1: Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—program Alternative 1: 417 MW (no impact)

As stated above, program Alternative 1 would not generate a significant amount of wastewater, and water for use in the program area would be trucked in. No new water or wastewater treatment facilities would be required. There would be no impact.

Impact UT-2a-2: Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—program Alternative 2: 450 MW (no impact)

As stated above, program Alternative 1 would not generate a significant amount of wastewater, and water for use in the program area would be trucked in. No new water or wastewater treatment facilities would be required. There would be no impact.

Impact UT-2b: Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—Golden Hills Project (no impact)

The Golden Hills Project would not generate a significant amount of wastewater, and water for use at the project area would be trucked in. No new water or wastewater treatment facilities would be required. There would be no impact.

Impact UT-2c: Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—Patterson Pass Project (no impact)

The Patterson Pass Project would not generate a significant amount of wastewater, and water for use at the project area would be trucked in. No new water or wastewater treatment facilities would be required. There would be no impact.

Impact UT-3a-1: Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—program Alternative 1: 417 MW (less than significant)

Projects associated with program Alternative 1 would all be located in a rural setting; stormwater runoff drains primarily through natural drainage swales, ditches, and watercourses. This alternative would not substantially modify the existing stormwater drainage patterns at the program area, and increases in impermeable surfaces onsite would be primarily limited to tower foundations. In addition, because program Alternative 1 would disturb more than 1 acre, it would require coverage under the state's Construction General Permit. Coverage under this permit requires developing and complying with a stormwater pollution and prevention plan (SWPPP). Consequently, impacts related to construction of new stormwater drainage facilities or expansion of existing facilities would be very minor. This impact would be less than significant. No mitigation is required.

Impact UT-3a-2: Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—program Alternative 2: 450 MW (less than significant)

Projects associated with program Alternative 2 would all be located in a rural setting; stormwater runoff drains primarily through natural drainage swales, ditches, and watercourses. This alternative would not substantially modify the existing stormwater drainage patterns at the program area, and increases in impermeable surfaces onsite would be primarily limited to tower foundations. In addition, because program Alternative 2 would disturb more than 1 acre, it would require coverage under the state's Construction General Permit. Coverage under this permit requires developing and complying with a stormwater pollution and prevention plan (SWPPP). Consequently, impacts related to construction of new stormwater drainage facilities or expansion of existing facilities would be very minor. This impact would be less than significant. No mitigation is required.

Impact UT-3b: Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—Golden Hills Project (less than significant)

The Golden Hills Project is located entirely in a rural setting; stormwater runoff drains primarily through natural drainage swales, ditches, and watercourses. The Golden Hills Project would not substantially modify the existing stormwater drainage patterns at the project site, and increases in impermeable surfaces onsite would be primarily limited to tower foundations. In addition, because the Golden Hills Project would disturb more than 1 acre, it would require coverage under the state's Construction General Permit. Coverage under this permit requires developing and complying with a SWPPP. Consequently, impacts related to construction of new stormwater drainage facilities or expansion of existing facilities would be very minor. This impact would be less than significant. No mitigation is required.

Impact UT-3c: Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects—Patterson Pass Project (less than significant)

The Patterson Pass Project is located entirely in a rural setting; stormwater runoff drains primarily through natural drainage swales, ditches, and watercourses. The Patterson Pass Project would not substantially modify the existing stormwater drainage patterns at the project site, and increases in impermeable surfaces onsite would be primarily limited to tower foundations. In addition, because the Patterson Pass Project would disturb more than 1 acre, it would require coverage under the state's Construction General Permit. This includes a SWPPP. Consequently, impacts related to construction of new stormwater drainage facilities or expansion of existing facilities would be very minor. This impact would be less than significant. No mitigation is required.

Impact UT-4a-1: Require new or expanded entitlements to water resources—program Alternative 1: 417 MW (less than significant)

Under this alternative of the program, the majority of water use would take place during construction. Water would be used for concrete mixing for the turbine tower and electrical substation foundations, as well as for dust control on roads and during grading and site work. Daily water use would vary. For construction of foundations, water would be transported to the batch plant site where it would be used to mix concrete. A minimal amount of water would be required for construction worker needs (e.g., drinking water, sanitation facilities). In addition, as part of final cleanup and site restoration activities, water would be needed for revegetation measures. The project proponent plans to draw needed water for water trucks and drinking water from an offsite source. The use of water is expected to be minimal, and no new or expanded entitlements to supply the program during construction or operation are anticipated. This impact is less than significant. No mitigation is required.

Impact UT-4a-2: Require new or expanded entitlements to water resources—program Alternative 2: 450 MW (less than significant)

Under this alternative of the program, the majority of water use would take place during construction. Water would be used for concrete mixing for the turbine tower and electrical substation foundations, as well as for dust control on roads and during grading and site work. Daily water use would vary. For construction of foundations, water would be transported to the batch plant site where it would be used to mix concrete. A minimal amount of water would be required for construction worker needs (e.g., drinking water, sanitation facilities). In addition, as part of final cleanup and site restoration activities, water would be needed for revegetation measures. The project proponent plans to draw needed water for water trucks and drinking water from an offsite source. The use of water is expected to be minimal, and no new or expanded entitlements to supply the program during construction or operation are anticipated. This impact is less than significant. No mitigation is required.

Impact UT-4b: Require new or expanded entitlements to water resources—Golden Hills Project (less than significant)

Water quantities used for the Golden Hills Project are expected to be minimal. The majority of water use would take place during construction. Water would be used for concrete mixing for the turbine tower and electrical substation foundations, as well as for dust control on roads and during grading and site work. Daily water use would vary. For construction of foundations, water would be transported to the batch plant site where it would be used to mix concrete. A minimal amount of water would be required for construction worker needs (e.g., drinking water, sanitation facilities). The project proponent plans to draw needed water for water trucks and drinking water from an offsite source.

The use of water is expected to be minimal, and no new or expanded entitlements to supply the project during construction or operation are anticipated. This impact is less than significant. No mitigation is required.

Impact UT-4c: Require new or expanded entitlements to water resources—Patterson Pass Project (less than significant)

Water quantities used for the Patterson Pass Project are expected to be minimal. The majority of water use would take place during construction. Water would be used for concrete mixing for the turbine tower and electrical substation foundations, as well as for dust control on roads and during grading and site work. Daily water use would vary. For construction of foundations, water would be transported to the batch plant site where it would be used to mix concrete. A minimal amount of water would be required for construction worker needs (e.g., drinking water, sanitation facilities). The project proponent plans to draw needed water for water trucks and drinking water from an offsite source.

The use of water is expected to be minimal, and no new or expanded entitlements to supply the project during construction or operation are anticipated. This impact is less than significant. No mitigation is required.

Impact UT-5a-1: Result in a determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the program's projected demand in addition to the provider's existing commitments—program Alternative 1: 417 MW (no impact)

No construction or expansion of wastewater systems would be required under program Alternative 1 because the windfarms would not be connected to a public sewer system. During construction, portable toilets would be utilized. No offsite wastewater treatment provider would be necessary. There would be no impact.

Impact UT-5a-2: Result in a determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the program's projected demand in addition to the provider's existing commitments—program Alternative 2: 450 MW (no impact)

No construction or expansion of wastewater systems would be required under program Alternative 2 because the windfarms would not be connected to a public sewer system. During construction, portable toilets would be utilized. No offsite wastewater treatment provider would be necessary. There would be no impact.

Impact UT-5b: Result in a determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments—Golden Hills Project (no impact)

No construction or expansion of wastewater systems would be required under the Golden Hills Project because it would not be connected to a public sewer system. During construction, portable toilets would be utilized. No offsite wastewater treatment provider would be necessary. There would be no impact.

Impact UT-5c: Result in a determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments—Patterson Pass Project (no impact)

No construction or expansion of wastewater systems would be required under the Patterson Pass Project because it would not be connected to a public sewer system. During construction, portable toilets would be utilized. No offsite wastewater treatment provider would be necessary. There would be no impact.

Impact UT-6a-1: Generate solid waste that would exceed the permitted capacity of landfills to accommodate the program's solid waste disposal needs—program Alternative 1: 417 MW (less than significant)

The majority of solid waste generation would take place during construction and during the decommissioning of windfarms. Minimal solid waste would be generated during the operation of the project. Program Alternative 1 is not anticipated to generate a substantial amount of solid waste because turbines and components will be sold or recycled, which will reduce the amount of solid waste taken to landfills. It is not anticipated that construction or operation of projects associated with program Alternative 1 would generate enough solid waste to affect the capacity of any landfill. This impact would be less than significant. No mitigation is required.

Impact UT-6a-2: Generate solid waste that would exceed the permitted capacity of landfills to accommodate the program's solid waste disposal needs—program Alternative 2: 450 MW (less than significant)

The majority of solid waste generation would take place during construction and during the decommissioning of windfarms. Minimal solid waste would be generated during the operation of the project. Program Alternative 2 is not anticipated to generate a substantial amount of solid waste because turbines and components will be sold or recycled, which will reduce the amount of solid waste taken to landfills. It is not anticipated that construction or operation of projects associated with program Alternative 1 would generate enough solid waste to affect the capacity of any landfill. This impact would be less than significant. No mitigation is required.

Impact UT-6b: Generate solid waste that would exceed the permitted capacity of landfills to accommodate the program's solid waste disposal needs—Golden Hills Project (less than significant)

The majority of solid waste generated would be during construction and during the decommissioning of windfarms. The Golden Hills Project is not anticipated to generate a substantial amount of solid waste because turbines and components will be sold or recycled, which will reduce the amount of solid waste taken to landfills. It is not anticipated that the construction or operation of the proposed project would generate enough solid waste to affect the capacity of any landfill. This impact would be less than significant. No mitigation is required.

Impact UT-6c: Generate solid waste that would exceed the permitted capacity of landfills to accommodate the program's solid waste disposal needs—Patterson Pass Project (less than significant)

The majority of solid waste generated would be during construction and during the decommissioning of windfarms. The Patterson Pass Project is not anticipated to generate a substantial amount of solid waste because turbines and components will be sold or recycled, which will reduce the amount of solid waste taken to landfills. It is not anticipated that construction or operation of the proposed project would generate enough solid waste to affect the capacity of any landfill. This impact would be less than significant. No mitigation is required.

Impact UT-7a-1: Not comply with federal, state, and local statutes and regulations related to solid waste—program Alternative 1: 417 MW (no impact)

The program would be required to comply with local, state, and federal solid waste regulations. Most of the solid waste would be limited to the construction phase, with minimal solid waste generated during the operation of the project. Most of the wind turbine components would be resold or recycled in compliance with the County construction site waste regulations. There would be no impact.

Impact UT-7a-2: Not comply with federal, state, and local statutes and regulations related to solid waste—program Alternative 2: 450 MW (no impact)

The program would be required to comply with local, state, and federal solid waste regulations. Most of the solid waste would be limited to the construction phase, with minimal solid waste generated during the operation of the project. Most of the wind turbine components would be resold or recycled in compliance with the County construction site waste regulations. There would be no impact.

Impact UT-7b: Not comply with federal, state, and local statutes and regulations related to solid waste—Golden Hills Project (no impact)

The Golden Hills Project would be required to comply with local, state, and federal solid waste regulations. Most of the solid waste would be limited to the construction phase, with minimal solid waste generated during the operation of the project. Most of the wind turbine components would be resold or recycled in compliance with the County construction site waste regulations. There would be no impact.

Impact UT-7c: Not comply with federal, state, and local statutes and regulations related to solid waste—Patterson Pass Project (no impact)

The Patterson Pass Project would be required to comply with local, state, and federal solid waste regulations. Most of the solid waste would be limited to the construction phase, with minimal solid waste generated during the operation of the project. Most of the wind turbine components would be resold or recycled in compliance with the County construction site waste regulations. There would be no impact.

3.16.3 References Cited

California Regional Water Quality Control Board—San Francisco Bay Region. 2008. *Updated Waste Discharge Requirements and Rescission of Order NO. 96-041*. Available: http://www.waterboards.ca.gov/sanfranciscobay/board_info/agendas/2008/august/vasco/vasco_road_to.pdf. Accessed: August 23, 2013.

Contra Costa County. n.d. *Vasco Road Landfill & Recycling Drop-off*. Available: http://www.co.contra-costa.ca.us/depart/cd/recycle/options/v5051.htm. Accessed: August 28, 2013.

Waste Management. n.d. *Altamont Landfill, Sustainability*. Available: http://altamontlandfill.wm.com/sustainability/index.jsp. Accessed: August 23, 2013.

Waste Management—Bay Area. n.d. *Altamont Landfill*. Available: http://wmcabay.wm.com/landfills/altamont.htm. Accessed: August 23, 2013.

Chapter 4
Alternatives Analysis

According to Section 15126.6 of the State CEQA Guidelines, an EIR must describe a reasonable range of feasible alternatives to the project or project location that could feasibly attain most of the basic project objectives and that would avoid or substantially lessen any of the significant impacts of the proposed project. Accordingly, alternatives that do not avoid or substantially lessen significant impacts of a project do not need to be analyzed in an EIR. Additionally, the State CEQA Guidelines require analysis of the No-Project Alternative to allow decision makers to compare the impacts of project approval with the impacts of not approving the project. The EIR must evaluate the comparative merits of the alternatives. The EIR must identify the environmentally superior alternative other than the No-Project Alternative.

An EIR is not required to present the alternatives analysis at the same level of detail as the assessment of the project, and it is not required to consider every conceivable alternative to a project. Rather, an EIR must consider a reasonable range of potentially feasible alternatives that will foster informed decision making.

This chapter is organized into the sections listed below.

- *Alternatives Screening Process* describes the program and project objectives, significant impacts of the project, and the alternatives considered.
- *Alternatives Analyzed* presents a qualitative analysis comparing the alternatives considered with the proposed project.
- *Environmentally Superior Alternative* presents the alternative that would result in the least amount of environmental impacts.

4.1 Alternatives Screening Process

CEQA requires that an EIR describe a reasonable range of feasible alternatives to the project, or to the location of the project, that could substantially reduce one or more of the project's significant environmental impacts while meeting most or all of the project's objectives. The EIR is required to analyze the potential environmental impacts of each of the alternatives, although not at the same level of detail as that at which the project is analyzed. There must be sufficient detail to facilitate comparing the respective merits of the alternatives.

Key provisions of the State CEQA Guidelines (Section 15126.6) pertaining to the alternatives analysis are summarized below.

- The discussion of alternatives will focus on alternatives to the project or its location that are feasible, meet most or all of the project objectives, and would substantially reduce one or more of the project's significant effects.
- The range of alternatives must include the *No-Project* alternative. The no-project analysis will discuss the existing conditions at the time the notice of preparation was published, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved based on current plans and consistent with available infrastructure and community

services. The No-Project alternative is not required to be feasible, meet any of the project objectives, or reduce the project's expected impacts to any degree.

- The range of alternatives required in an EIR is governed by a *rule of reason*; therefore, the EIR must evaluate only those alternatives necessary to permit a reasoned choice. An EIR is not required to analyze every conceivable alternative to a project.
- An EIR need not consider an alternative whose effects cannot be reasonably ascertained, whose implementation is remote and speculative, or that would not achieve the basic project objectives.

4.1.1 Screening Criteria

A range of potential alternatives was subjected to screening criteria to eliminate those potential alternatives that do not qualify as alternatives under CEQA. As discussed above, there was no attempt to include every conceivable alternative in this range. Rather, the County selected a number of representative alternatives to consider. The screening criteria for the potential alternatives are relatively simple.

- Does the alternative meet most or all of the program and project objectives?
- Is the alternative potentially feasible?
- Would the alternative substantially reduce one or more of the significant effects associated with the program or project?

4.1.2 Project Objectives

As described in Chapter 2, *Program Description*, the two primary objectives of the program are to facilitate efficient wind energy production through repowering and to avoid and minimize impacts on terrestrial and avian wildlife caused by repowered wind turbine construction, operation, and maintenance in the program area. The specific program objectives are listed below.

- Allow for appropriate and compatible repowering and operation of wind turbines consistent with existing repowering timeline requirements set forth in the existing CUPs, related agreements, and project-specific power purchase agreements.
- Reduce avian mortality caused by wind energy generation in the program area through repowering.
- Meet the County's goals to provide environmentally sensitive, clean-renewable wind energy for the twenty-first century as identified in the ECAP (Policies 168–175 and Programs 73–76).
- Help meet the Governor's Executive Order S-14-08 in meeting the Renewables Portfolio Standard (RPS) target that all retail sellers of electricity serve 33% of their load with renewable energy by 2020.
- Contribute to state progress toward air quality improvement and greenhouse gas emission reduction goals, as set forth in Assembly Bill 32.
- Improve habitat quality in the program area through removal of roads and existing wind turbines and their supporting infrastructure, resulting in lower overall operational footprint, and providing a wide range of habitat benefits to sensitive terrestrial and avian species.

4.1.3 Feasibility

Feasible is defined as “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors” (State CEQA Guidelines Section 15364). CEQA does not require that an EIR determine the ultimate feasibility of a selected alternative but rather that it is probably feasible. Accordingly, no economic studies have been prepared regarding the economic feasibility of the selected alternatives.

4.1.4 Significant Impacts

Table 4-1 lists the significant impacts of the program alternatives identified in Chapter 3, *Impact Analysis*.

The impacts of program Alternatives 1 and 2 were found to be very similar. Because turbines were assumed to be installed in projects consistent with the size typically proposed, approximately 80 MW per project, construction on a daily and seasonal basis would be the same. Because the number of turbines associated with program Alternative 2 would be a maximum of 21 more than that associated with program Alternative 1 (using the smallest nameplate capacity—1.6 MW—under consideration), the additional construction period would not be much longer than under Alternative 1. Therefore, impacts related to construction, such as air emissions and traffic, would be the same.

Because program Alternative 2 would result in the construction of more turbines, generating more power, that alternative would have a greater impact related to bird and bat mortality, an impact found to be significant and unavoidable under all alternatives with the exception of the No Project alternative. Other impacts that may be higher under program Alternative 2 than under program Alternative 1, such as impacts related to cultural or paleontological resources, visual resources, or impacts related to erosion, could all be reduced to a less-than-significant level by the same mitigation measures as those provided for program Alternative 1. For these reasons, the impacts presented in Table 4-2 represent the impacts of both program Alternative 1 and program Alternative 2.

Impacts related to the following topics would remain significant with implementation of mitigation.

- **Air Quality:** Construction emissions of ROG and NO_x for program Alternatives 1 and 2 are greater than the BAAQMD thresholds after implementation of Mitigation Measures AQ-1 and AQ-2 (Table 3.3-11); accordingly, cumulative construction impacts would be significant and unavoidable. For the Golden Hills and the Patterson Pass projects individually, construction emissions of NO_x would be greater than the BAAQMD thresholds after implementation of Mitigation Measures AQ-1 and AQ-2 (Tables 3.3-16 and 3.3-21); accordingly, cumulative construction impacts would be significant and unavoidable.
- **Biological Resources:** Operation of the either program alternative, as well as the Golden Hills and Patterson Pass projects individually, would result in avian and bat mortality associated with turbine collisions, including effects on raptors, other birds, and bats migrating through and wintering in the program area. Although mitigation can reduce these impacts, the likelihood of ongoing turbine-related mortality would constitute a significant and unavoidable impact.
- **Cumulative Traffic Impacts:** Cumulative impacts on traffic operation, safety hazards, emergency access, and bicycle facilities could result from program and project construction activities if they take place concurrently with construction of the Sand Hill Repowering Project, which has been identified as resulting in a significant and unavoidable traffic impact.

Table 4-1. Summary of Significant Impacts and Required Mitigation Measures

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
Aesthetics			
AES-1: Temporary visual impacts caused by construction activities	S	AES-1: Limit construction to daylight hours	LTS
AES-2: Have a substantial adverse effect on a scenic vista	S	AES-2a: Require site development review AES-2b: Maintain site free of debris and restore abandoned roadways AES-2c: Screen surplus parts and materials	LTS
AES-3: Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings along a scenic highway	S	AES-2a: Require site development review AES-2b: Maintain site free of debris and restore abandoned roadways AES-2c: Screen surplus parts and materials AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road	LTS
AES-4: Substantially degrade the existing visual character or quality of the site and its surrounding	S	AES-2a: Require site development review AES-2b: Maintain site free of debris and restore abandoned roadways AES-2c: Screen surplus parts and materials AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road	LTS
AES-5: Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area	S	AES-5: Analyze shadow flicker distance and incorporate changes into project design to address shadow flicker if necessary	LTS
AES-6: Consistency with state and local policies	S	AES-2a: Require site development review AES-2b: Maintain site free of debris and restore abandoned roadways AES-2c: Screen surplus parts and materials	LTS

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
		AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road	
		AES-5: Analyze shadow flicker distance and incorporate changes into project design to address shadow flicker if necessary	
Agricultural and Forestry Resources			
AG-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use	S	AG-1: Avoid conversion of Prime Farmland	LTS
AG-5: Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use	S	AG-1: Avoid conversion of Prime Farmland	LTS
Air Quality			
AQ-2: Violate any air quality standard or contribute substantially to an existing or projected air quality violation	S	AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures	SU
		AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures	
AQ-3: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)	S	AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures	SU
		AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures	
AQ-4: Expose sensitive receptors to substantial pollutant concentrations	S	AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures	LTS

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
		AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures	
Biological Resources			
BIO-1: Potential for ground-disturbing activities to result in adverse effects on special-status plants or habitat occupied by special-status plants	S	BIO-1a: Conduct surveys to determine the presence or absence of special-status plant species	LTS
		BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	
		BIO-1c: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones	
		BIO-1d: Compensate for impacts on special-status plant species	
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
BIO-2: Adverse effects on special-status plants and natural communities resulting from the introduction and spread of invasive plant species	S	BIO-2: Prevent introduction, spread, and establishment of invasive plant species	LTS
BIO-3: Potential mortality of or loss of habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-3b: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle	
BIO-4: Potential disturbance or mortality of and loss of suitable habitat for valley elderberry longhorn beetle	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle	
		BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle	
BIO-5: Potential disturbance or mortality of and loss of suitable habitat for California tiger salamander, western spadefoot, California red-legged frog, and foothill yellow-legged frog	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians	
		BIO-5b: Compensate for loss of habitat for special-status amphibians	
		BIO-5c: Restore disturbed annual grasslands	
BIO-6: Potential disturbance or mortality of and loss of suitable habitat for western pond turtle	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-6: Conduct preconstruction surveys for western pond turtle and monitor construction activities if turtles are observed	
BIO-7: Potential disturbance or mortality of and loss of suitable habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5c: Restore disturbed annual grasslands	
		BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles	
		BIO-7b: Compensate for loss of habitat for special-status reptiles	
BIO-8: Potential construction-related disturbance or mortality of special-status and non–special-status migratory birds	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-5c: Restore disturbed annual grasslands	
		BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non–special-status nesting birds	
		BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl	
BIO-9: Permanent and temporary loss of foraging habitat for western burrowing owl, tricolored blackbird, and other special-status and non–special-status birds	S	BIO-5b: Compensate for loss of habitat for special-status amphibians	LTS
		BIO-5c: Restore disturbed annual grasslands	
		BIO-9: Compensate for the permanent loss of foraging habitat for western burrowing owl	
BIO-10: Potential injury or mortality of and loss of habitat for San Joaquin kit fox and American badger	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	LTS

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species BIO-5c: Restore disturbed annual grasslands BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger	
BIO-11: Avian mortality resulting from interaction with wind energy facilities	S	BIO-11a: Prepare a project-specific avian protection plan BIO-11b: Site turbines to minimize potential mortality of birds BIO-11c: Use turbine designs that reduce avian impacts BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure BIO-11e: Retrofit existing infrastructure to minimize risk to raptors BIO-11f: Discourage prey for raptors BIO-11g: Implement postconstruction avian fatality monitoring for all repowering projects BIO-11h: Compensate for the loss of raptors and other avian species, including golden eagles, by contributing to conservation efforts BIO-11i: Implement an avian adaptive management program	SU
BIO-12: Potential mortality or disturbance of bats from roost removal or disturbance	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species BIO-12a: Conduct bat roost surveys	LTS

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
		BIO-12b: Avoid removing or disturbing bat roosts	
BIO-14: Turbine-related fatalities of special-status and other bats	S	BIO-14a: Site and select turbines to minimize potential mortality of bats	SU
		BIO-14b: Implement postconstruction bat fatality monitoring program for all repowering projects	
		BIO-14c: Prepare and publish annual monitoring reports on the findings of bat use of the project area and fatality monitoring results	
		BIO-14d: Develop and implement a bat adaptive management plan	
		BIO-14e: Compensate for expenses incurred by rehabilitating injured bats	
BIO-15: Potential for road infrastructure upgrades to result in adverse effects on alkali meadow	S	BIO-15: Compensate for the loss of alkali meadow habitat	LTS
BIO-16: Potential for road infrastructure upgrades to result in adverse effects on riparian habitat	S	BIO-16: Compensate for the loss of riparian habitat	LTS
BIO-18: Potential for road infrastructure upgrades to result in adverse effects on wetlands	S	BIO-18: Compensate for the loss of wetlands	LTS
BIO-19: Potential impact on the movement of any native resident or migratory wildlife species or established native resident or migratory wildlife corridors, and the use of native wildlife nursery sites	S	BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	SU
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	
		BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle	
		BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians	
		BIO-5c: Restore disturbed annual grasslands	

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
		BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles	
		BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non–special-status nesting birds	
		BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl	
		BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger	
		BIO-11b: Site turbines to minimize potential mortality of birds	
		BIO-11c: Use turbine designs that reduce avian impacts	
		BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure	
		BIO-11e: Retrofit existing infrastructure to minimize risk to raptors	
		BIO-11i: Implement an avian adaptive management program	
		BIO-12a: Conduct bat roost surveys	
		BIO-12b: Avoid removing or disturbing bat roosts	
		BIO-14a: Site and select turbines to minimize potential mortality of bats	
		BIO-14d: Develop and implement a bat adaptive management plan	
BIO-20. Conflict with local plans or policies	S	BIO-1a: Conduct surveys to determine the presence or absence of special-status species	LTS
		BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	
		BIO-1c: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones	
		BIO-1d: Compensate for impacts on special-status plant species	

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
		BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	
		BIO-3a: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle	
		BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle	
		BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle	
		BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians	
		BIO-5b: Compensate for loss of habitat for special-status amphibians	
		BIO-5c: Restore disturbed annual grasslands	
		BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles	
		BIO-7b: Compensate for loss of habitat for special-status reptiles	
		BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non-special-status nesting birds	
		BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl	
		BIO-9: Compensate for the permanent loss of foraging habitat for western burrowing owl	
		BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger	
		BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger	
		BIO-15: Compensate for the loss of alkali meadow habitat	

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
		BIO-16: Compensate for the loss of riparian habitat	
		BIO-18: Compensate for the loss of wetlands	
Cultural Resources			
CUL-1: Cause a substantial adverse change in the significance of a historical resource	S	CUL-1a: Avoid historic resources	LTS
		CUL-1b: Appropriate recordation of historic resources	
CUL-2: Cause a substantial adverse change in the significance of an archaeological resource	S	CUL-2a: Conduct a preconstruction cultural field survey and cultural resources inventory and evaluation	LTS
		CUL-2b: Develop a treatment plan for any identified significant cultural resources	
		CUL-2c: Conduct worker awareness training for archaeological resources prior to construction	
		CUL-2d: Stop work if cultural resources are encountered during ground-disturbing activities	
CUL-3: Disturb any human remains, including those interred outside of formal cemeteries	S	CUL-3: Stop work if human remains are encountered during ground-disturbing activities	LTS
Geology and Soils			
GEO-1: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of rupture of a known earthquake fault	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-2: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of strong seismic ground shaking	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-3: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of seismic-related ground failure, including landsliding and liquefaction	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-4: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of landsliding	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
GEO-6: Be located on expansive soil, creating substantial risks to life or property	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
GEO-7: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature	S	GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
Greenhouse Gas Emissions			
GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases	S	GHG-2a: Implement best available control technology for heavy-duty vehicles	LTS
		GHG-2b: Install low SF_6 leak rate circuit breakers and monitoring	
		GHG-2c: Require new construction to use building materials containing recycled content	
		GHG-2d: Comply with construction and demolition debris management ordinance	
Hazards and Hazardous Materials			
HAZ-4: Location on a hazardous materials site, creating a significant hazard to the public or the environment	S	HAZ-4: Perform a Phase I Environmental Site Assessment prior to construction activities and remediate if necessary	LTS
HAZ-5: Location within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard for people residing or working in the project area	S	HAZ-5: Coordinate with the Contra Costa ALUC prior to final design	LTS
HAZ-7: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan	S	TRA-1: Develop and implement a construction traffic control plan	LTS
Hydrology and Water Quality			
WQ-1: Violate any water quality standards or waste discharge requirements	S	WQ-1: Comply with NPDES requirements	LTS
WQ-3: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite	S	WQ-1: Comply with NPDES requirements	LTS

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
WQ-4: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite	S	WQ-1: Comply with NPDES requirements	LTS
WQ-5: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff	S	WQ-1: Comply with NPDES requirements	LTS
WQ-6: Otherwise substantially degrade water quality	S	WQ-1: Comply with NPDES requirements	LTS
WQ-10: Contribute to inundation by seiche, tsunami, or mudflow	S	WQ-1: Comply with NPDES requirements	LTS
Noise			
NOI-1: Exposure of residences to noise from new wind turbines	S	NOI-1: Perform project-specific noise studies and implement measures to comply with County noise standards	LTS
NOI-2: Exposure of residences to noise during decommissioning and new turbine construction	S	NOI-2: Employ noise-reducing practices during decommissioning and new turbine construction	LTS
Transportation/Traffic			
TRA-1: Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit or conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways	S	TRA-1: Develop and implement a construction traffic control plan	LTS
TRA-4: Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) due to construction-generated traffic	S	TRA-1: Develop and implement a construction traffic control plan	LTS

Impact	Significance before Mitigation	Mitigation	Significance after Mitigation
TRA-5a-1: Result in inadequate emergency access due to construction-generated traffic	S	TRA-1: Develop and implement a construction traffic control plan	LTS
TRA-6: Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities	S	TRA-1: Develop and implement a construction traffic control plan	LTS

S = significant; LTS = less than significant; SU = significant and unavoidable.

4.1.5 Alternatives Subjected to Screening

The following alternatives were considered and subjected to the screening process described above. All of these alternatives are program alternatives. Alternatives to the two specific projects proposed (Golden Hills and Patterson Pass) were not specifically considered for the following reasons:

- Project site alternatives for either project could be either the other project site or another site within the Program Area. Impacts of construction of a windfarm project at either of the project sites or at other locations in the Program Area are considered and presented in this EIR.
- The alternatives considered for the Program would also apply to the projects. For example, an alternative to the Golden Hills or Patterson Pass project could be no repowering and reauthorization of the existing turbines at those project sites. The impacts of such an alternative on a comparative level are presented in this EIR.

No Project—No Repowering, Reauthorization of Existing CUPs

Under the No Project—No Repowering, Reauthorization of Existing CUPs alternative, there would be no decommissioning of the existing turbines. The existing first- and second-generation turbines would continue to operate and no new repowered turbines would be installed. This alternative would require that new CUPs be authorized.

No Repowering, Full Decommissioning

Under the No Repowering, Full Decommissioning alternative, no repowering would occur and the wind turbines in the program area would be decommissioned at the expiration of the existing CUPs. The existing windfarms would continue operating using the existing facilities until the CUPs from the County expire. Decommissioning efforts would begin with the expiration of the first CUP. Following expiration of all CUPs and decommissioning of the existing wind turbines, the program area would be restored to pre-permit conditions.

Fewer New Turbines

Under this alternative, there would be fewer new turbines and a smaller nameplate capacity than under the proposed program. The program area boundaries would be the same as under the proposed program, and all existing first- and second-generation turbines would be decommissioned.

Reduced Footprint

Under the Reduced Footprint alternative, the same number of new turbines would be installed as under the proposed program within a reduced program area boundary. Because there would be the same number of turbines in a smaller area, turbine density would be greater under this alternative than under the proposed program.

Avoid Specific Biologically Sensitive / Constrained Areas

This alternative would prescribe a turbine layout that would avoid placing new turbines in areas that would necessitate the construction of new roads traversing biologically sensitive or constrained areas. This alternative's perimeter and the total maximum number of wind turbines would be the same as under the proposed program.

No New Roads

This alternative would entail the same number of turbines in the same program area as the proposed program. However, no road improvements would be made. Although new roads are not required for the decommissioning of existing turbines, larger and longer trucks and cranes would be required for transport and installation of repowered turbine components. Because the existing roads would not accommodate the trucks required for construction of the repowered wind turbines, helicopters would be used to transport large equipment and turbine components to project sites for construction.

Shrouded (Smaller) Turbines

Under this alternative, the existing first- and second-generation turbines would be replaced with shrouded turbines. The shrouded turbines would be smaller and shorter than the turbines proposed under the program. Experimental technologies are being developed involving such turbines. The turbines would have nameplate capacities of approximately 100 kV and would be mounted on free-standing smooth exterior finished towers. These turbines would have an approximate hub height of 120 feet, rotor/shroud diameter of 66 feet, and total tower height of 153 feet. A test project to install 40 shrouded turbines and evaluate their effectiveness at reducing avian mortality on three sites in the APWRA is the subject of a separate EIR (Sand Hill Wind Project, SCH no. 2013032016), and an additional 300 such turbines may be installed in the future depending on the evaluation of the first phase.

Airborne Wind Turbines

Under this alternative, the existing first- and second-generation wind turbines would be replaced with airborne wind turbines (AWTs). A conceptual AWT has been proposed, operation as a tethered airfoil with a wingspan of approximately 28 meters (91.9 feet) and a generation capacity of 600 kW. The wing would launch and land by hovering like a helicopter. The AWT operates in vertical loops from its tether, like the tip of a conventional wind turbine blade, completing each rotation in about 1–2 minutes. The altitude of the AWT during operation ranges from 459 to 1,067 feet.

4.1.6 Alternatives Considered but Eliminated from Further Analysis

Alternatives that Do Not Meet the Program Objectives

Alternatives that do not avoid or substantially lessen significant impacts of the project or that do not meet the project objectives do not need to be analyzed in an EIR. Most of the alternatives screened, other than the no-project alternatives, would meet the program objectives because each alternative would repower the existing wind turbines with current-generation turbines, with the intent of reducing avian mortality and creating clean and renewable energy consistent with the County's goals for wind energy and the Governor's Renewable Portfolio Standard target. However, at this time there is no evidence or information indicating that shrouded turbines or the AWTs would reduce avian mortality. Accordingly, because the Shrouded (Smaller) Turbine alternative and the Airborne Wind Turbine alternative would not meet all the program objectives; these alternatives are not considered further in this PEIR.

Infeasible Alternatives

Infeasible alternatives are not required to be considered in the EIR. The Reduced Footprint alternative would not be feasible. Alameda County has developed an updated list of turbine setback requirements, based on multiples of the total height of the wind turbine, including the blade (i.e., the taller the turbine, the larger the setback). Setback requirements, in conjunction with technological considerations (e.g., distance between turbines to prevent turbulence effects), would not allow the same number of wind turbines in a smaller area. Therefore, this alternative is considered infeasible and is not considered further in this PEIR.

4.2 Alternatives Analyzed in the EIR

Of the eight alternatives considered in alternative screening, three were screened out, as described above. The following five alternatives were evaluated in comparison to the proposed program in this PEIR.

- No Project—No Repowering, Reauthorization of Existing CUPs
- No Repowering, Full Decommissioning
- Fewer New Turbines
- Avoid Specific Biologically Sensitive / Constrained Areas
- No New Roads

In several cases, the severity of the impact may be the same under the alternatives as measured against the CEQA significance thresholds (e.g., both the program and a given alternative would result in a less-than-significant impact). However, the actual magnitude of the impact may be slightly different, providing the basis for a conclusion of greater or lesser impacts, even though both are considered less than significant. Table 4-2 presents a summary matrix of the program impacts in comparison with the five alternatives.

Table 4-2. Comparison of Program Alternatives to the Program

		Impact Compared to Proposed Program				
Environmental Topic Area	Level of Program Impact	No Project—No Repowering, Reauthorization of Existing CUPs	No Repowering, Full Decommissioning	Fewer New Turbines	Avoid Specific Biologically Sensitive / Constrained Areas	No New Roads
Aesthetics	Less than significant with mitigation	Less	Less	Similar but slightly less	Similar	Greater
Agricultural and Forestry Resources	Less than significant with mitigation	Less	Less	Similar	Similar	Similar
Air Quality	Significant and unavoidable	Less	Similar but slightly less	Similar	Similar	Similar but slightly greater
Biological Resources	Significant and unavoidable	Greater	Less	Less	Similar but slightly less	Similar but slightly less
Cultural Resources	Less than Significant with mitigation	Less	Similar but slightly less	Similar but slightly less	Similar	Similar but slightly less
Geology, Soils, Mineral Resources, and Paleontology	Less than significant with mitigation	Less	Similar but slightly less	Similar	Similar	Similar
Greenhouse Gas Emissions	Less than significant with mitigation	Less	Greater	Similar but slightly greater	Similar	Greater
Hazards and Hazardous Materials	Less than significant with mitigation	Less	Similar but slightly less	Similar but slightly less	Similar	Similar
Hydrology and Water Quality	Less than significant with mitigation	Less	Less	Similar but slightly less	Similar	Similar but slightly less
Land Use and Planning	Less than significant	Similar	Similar	Similar	Similar	Similar
Noise (Short-term)	Less than significant with mitigation	Less	Similar but slightly less	Similar	Similar	Similar but slightly greater
Noise (Long-term)	Less than significant with mitigation	Similar but slightly greater	Less	Less	Similar	Similar

		Impact Compared to Proposed Program				
Environmental Topic Area	Level of Program Impact	No Project—No Repowering, Reauthorization of Existing CUPs	No Repowering, Full Decommissioning	Fewer New Turbines	Avoid Specific Biologically Sensitive / Constrained Areas	No New Roads
Population and Housing	Less than significant	Less	Less	Similar but slightly less	Similar	Similar
Public Services	Less than significant	Less	Similar but slightly less	Similar	Similar	Similar
Recreation	No impact	Similar	Similar	Similar	Similar	Similar
Traffic/Transportation	Less than significant with mitigation	Less	Similar but slightly less	Similar	Similar	Similar but slightly less
Utilities and Service Systems	Less than significant	Less	Similar but slightly less	Similar	Similar	Similar

Note: Although the alternatives may result in lesser or greater impacts compared with the proposed program, the difference may be incremental and would not change the significance conclusion or requirement for mitigation.

4.2.1 No Project—No Repowering, Reauthorization of Existing CUPs

Aesthetics

Under the No Project—No Repowering, Reauthorization of Existing CUPs alternative, there would be neither a temporary nor any permanent change to current views, visual character, daytime glare or nighttime lighting. Therefore, impacts on visual/aesthetics would be less under this alternative than under the proposed program.

Agricultural and Forestry Resources

As described in Section 3.2, *Agricultural and Forestry Resources*, there are 24.21 acres of Prime Farmland and 0.36 acre of Farmland of Statewide Importance in the program area. Because there would be no construction or change in land use, there would be no potential conversion of Prime Farmland or Farmland of Statewide Importance to a nonagricultural use under the No Repowering—Reauthorization of Existing CUPs alternative. Therefore, the impacts on Agricultural and Forestry Resources under this alternative would be less than under the proposed program.

Air Quality

The No Project—No Repowering, Reauthorization of Existing CUPs alternative would not generate short-term construction-related emissions that would result from construction of the proposed program. Therefore, this alternative would avoid the significant and unavoidable impacts related to construction emissions, and impacts on air quality would be less than under the proposed program.

Biological Resources

Because the No Project—No Repowering, Reauthorization of Existing CUPs alternative would not entail ground-disturbing activities, the effects on terrestrial biological resources would be less than under the program. However, because a key objective of the program (which could be accomplished by the replacement of older wind turbines with newer designs) is the reduction of avian fatalities, avian fatalities would likely be greater under this alternative than under the program.

Cultural Resources

Several cultural resources are present in the program area. The potential disruption to historic and archaeological resources associated with the program would not occur under this alternative because there would be no ground disturbance. Therefore, the impacts on cultural resources under this alternative would be less than under the program.

Geology, Soils, Mineral Resources, and Paleontological Resources

The No Project—No Repowering, Reauthorization of Existing CUPs alternative would not result in any of the geologic/soils impacts associated with construction and operation of new turbines. Mitigation measures are identified in this EIR that would reduce potential geology and soils impacts to a less-than-significant level. This alternative would have no need for such mitigation. Therefore, the impacts on geology, soils, mineral resources, and paleontological resources under this alternative would be less than under the program.

Greenhouse Gas Emissions

The No Project—No Repowering, Reauthorization of Existing CUPs alternative would not generate any short-term construction-related GHG emissions. However, the full annual GHG emissions reduction of approximately 97,000 metric tons of CO_2e associated with the proposed program would not occur under this alternative, although wind energy would still be generated and GHG emissions would be reduced concomitant with the amount of wind energy generated by those turbines. This alternative would have no significant impact on GHG emissions.

Hazards and Hazardous Materials

Because the No Project—No Repowering, Reauthorization of Existing CUPs alternative would entail no new construction activities, construction workers would not be exposed to potentially hazardous materials associated with construction materials, ground disturbance, or decommissioning older turbines. Operational impacts associated with hazards and hazardous materials would be similar to those under the proposed program, with the exception of potential blade throw hazards. The potential blade throw hazard would be greater, because the existing old-generation turbines are subject to higher rates of structural failure than are new-generation turbines. Consequently, impacts related to hazards and hazardous materials under this alternative would be greater than under the proposed program.

Hydrology and Water Quality

Under this alternative, there would be no polluted runoff or changes to water quality because there would be no construction. There would be no changes to the impermeable surfaces, and the existing drainage pattern would remain unchanged. Consequently, impacts related to hydrology and water quality under this alternative would be less than under the proposed program.

Land Use and Planning

The No Project—No Repowering, Reauthorization of Existing CUPs alternative would result in the continuation of the existing uses in the program area. The effects of this alternative would be similar to those under the proposed program as both are consistent with the existing land use plans, policies, and regulations.

Noise

Under the No Project—No Repowering, Reauthorization of Existing CUPs alternative it is possible that substantial degradation of a wind turbine or group of wind turbines could lead to an increase of noise levels above the existing operating noise levels as a result of aging or a lack of maintenance of the existing turbines. Additionally, the new turbines that would be installed under the proposed program are expected to be quieter than the existing turbines. Although construction noise would not occur, operational noise would be higher than under the proposed program. Under this alternative, impacts related to noise would be less than under the proposed program in the short term, and similar but slightly greater in the long term.

Population and Housing

The No Project—No Repowering, Reauthorization of Existing CUPs alternative would have no effect on the local labor pool and there would be no indirect effect on population or housing. Therefore, the impacts on population and housing under this alternative would be less than under the proposed program.

Public Services

Under this alternative, there would be no changes in demand on service providers and, therefore, no impacts. Therefore, impacts on public services under this alternative would be less than impacts under the proposed program.

Recreation

Like the program, this alternative would not result in an increase in the use of existing neighborhood and regional parks and would not include recreational facilities. Therefore, impacts on recreation under this alternative would be similar to those under the proposed program.

Traffic/Transportation

The No Project—No Repowering, Reauthorization of Existing CUPs alternative would not generate construction-related truck traffic. Therefore, the impacts on traffic and transportation under this alternative would be less than under the proposed program.

Utilities and Service Systems

The No Project—No Repowering, Reauthorization of Existing CUPs alternative would not result in any change in water consumption, wastewater generation, stormwater drainage, or solid waste during construction or operation. Therefore, the impacts on utilities and service systems under this alternative would be less than under the proposed program.

4.2.2 No Repowering, Full Decommissioning

Aesthetics

The temporary impacts on aesthetics associated with decommissioning the existing windfarm facilities would be similar to those under the proposed program. Once all the turbines are removed, the program area would be returned to pre-permit conditions and would not contain any development. Therefore, the impacts on aesthetics under this alternative would be less than under the program because the program area would be returned to pre-project conditions.

Agricultural and Forestry Resources

As described previously, there are 24.21 acres of Prime Farmland and 0.36 acre of Farmland of Statewide Importance in the Program area. Under this alternative, there would be no conversion of Prime Farmland or Farmland of Statewide Importance to a nonagricultural use. Therefore, the impacts on agricultural and forestry resources under this alternative would be less than under the proposed program.

Air Quality

As shown in Section 3.3, *Air Quality*, Table 3.3-5, the amount of ROG and NOx emissions from decommissioning and foundation removal would exceed the BAAQMD significance thresholds. Implementation of mitigation identified in Chapter 3 would reduce emissions of ROG during the decommissioning and foundation removal phase, but emissions of NOx would still exceed the BAAQMD threshold, resulting in a significant and unavoidable impact. Therefore, impacts on air quality under this alternative would be similar to, but slightly less than those under the proposed program.

Biological Resources

Decommissioning activities associated with this alternative would result in the same impacts on terrestrial resources as those associated with the proposed program; however, there would be no disturbance associated with new construction. Moreover, because no new turbines would be installed, there would be a complete elimination of turbine-related avian and bat fatalities. The impacts on biological resources under this alternative would be less than those under the proposed program.

Cultural Resources

Decommissioning the existing wind turbines under this alternative could result in disruption of known or unknown archaeological resources or human remains, but would likely not affect historic resources. Because no new wind turbines would be installed, there would be no potential disruption to cultural resources during installation. Consequently, the impacts on cultural resources under this alternative would be similar to, but slightly less than those under the proposed program.

Geology, Soils, Mineral Resources, and Paleontological Resources

Like the proposed program, this alternative could result in soil erosion or impacts on paleontological resources during decommissioning of the existing wind turbines. However, because there would be no installation of new turbines, there would be no impacts related to the potential placement of turbines near active faults or in areas with potential to experience strong ground shaking, seismic-related ground failure, or placement on expansive soils. Therefore, impacts related to geology, soils, mineral resources, and paleontological resources under this alternative would be similar to but slightly less than those under the proposed program.

Greenhouse Gas Emissions

Emissions associated with decommissioning the existing windfarm would be similar to those under the proposed program. However, the annual GHG emissions reduction of approximately 97,000 metric tons of CO_2e would not occur under this alternative. Accordingly, this alternative would have greater impacts than the proposed program.

Hazards and Hazardous Materials

Under this alternative, construction workers would not be exposed to any hazardous materials once decommissioning is complete. Once all wind turbines are decommissioned, operational impacts under this alternative would be less than under the proposed program because there would be no wind turbines in the program area and there would be no O&M workers. Consequently, impacts related to hazards and hazardous materials under this alternative would be similar to but less than those under the proposed program.

Hydrology and Water Quality

Under this alternative, decommissioning activities could result in increased erosion and discharge of sediment to surface waters, similar to such impacts under the proposed program. Once all turbines are decommissioned, there would be a decrease in impermeable surfaces, thereby improving the existing drainage patterns. Therefore, impacts related to hydrology and water quality under this alternative would be less than those under the proposed program.

Land Use and Planning

The impacts under the No Repowering, Full Decommissioning alternative would be similar to those under the proposed program because both alternatives involve uses that are consistent with the existing land use plans, policies, and regulations.

Noise

The No Repowering, Full Decommissioning alternative would result in short-term noise impacts during decommissioning that would be similar to those under the proposed program. There would be no construction-related noise and no operational noise. Therefore, impacts related to noise in the short term would be similar to but slightly less than those under the proposed program; long-term noise impacts would be substantially less than under the proposed program.

Population and Housing

The No Repowering, Full Decommissioning alternative would require construction workers to decommission the existing turbines, but would require no construction workers for installation of repowered turbines or associated facilities. This alternative would not require any operations and maintenance workers. Therefore, the impacts on population and housing under this alternative would be less than under the proposed program.

Public Services

Like the proposed program, this alternative would not result in substantial increases in demand for any public services during decommissioning activities. This alternative could result in a decreased demand for police or fire services once all the turbines are decommissioned. Accordingly, impacts on public services under this alternative would be similar to but slightly less than those under the proposed program.

Recreation

Like the proposed program, this alternative would not result in an increase in the use of existing neighborhood and regional parks and would not include recreational facilities. Therefore, recreation impacts under this alternative would be similar to those under the proposed program.

Traffic/Transportation

Under this alternative, construction traffic from decommissioning the existing turbines would be similar to that under the proposed program, but there would be no traffic associated with installation of new turbines. There would be no operational traffic because there would no longer be O&M activities. Because this alternative would involve truck traffic related to decommissioning the existing wind turbines, the impacts on traffic and transportation under this alternative would be similar to but substantially less than those under the proposed program.

Utilities and Service Systems

Under this alternative, decommissioning activities could result in impacts on water consumption, wastewater generation, stormwater drainage, and solid waste similar to those under the proposed program. There would be no operational impact on utilities because there would no longer be O&M activities. Accordingly, the impacts on utilities and service systems under this alternative would be similar to but slightly less than those under the proposed program.

4.2.3 Fewer New Turbines

Aesthetics

This alternative would have short-term construction impacts similar to those of the proposed program. Under this alternative, the type of turbine would be the same as under the proposed program, but there would be fewer turbines distributed across the landscape. Consequently, there would be fewer turbines detracting from the natural landscape in the program area. Therefore, impacts on aesthetics under this alternative would be similar to but slightly less than those under the proposed program.

Agricultural and Forestry Resources

This alternative would entail fewer new turbines in the program area. Although there would be fewer new turbines than under the proposed program, there would be potential for the new turbines to be located on Prime Farmland or Farmland of Statewide Importance, thereby converting the land to a nonagricultural use. Consequently, this alternative would require the same mitigation measure that would be required for the proposed program, and impacts related to agricultural and forestry resources would be similar to those under the proposed program.

Air Quality

This alternative would include the decommissioning of the existing wind turbines, but would entail fewer new turbines. As shown in Table 3.3-5 in Section 3.3, *Air Quality*, ROG and NOx emissions during program construction exceed the BAAQMD significance thresholds. This alternative would result in the same emissions as the proposed program during the decommissioning and foundation removal phase. However, emissions associated with construction of roads and turbine foundations, batch plant operations, and truck and worker trips could be less than under the proposed program. Installing fewer turbines could avoid the significant and unavoidable impact related to short-term construction-related ROG emissions. However, regardless of the number of turbines installed, NO_x emissions associated with decommissioning activities would still exceed the BAAQMD threshold.

This alternative would result in a significant and unavoidable impact; impacts on air quality under this alternative would be similar to those under the proposed program.

Biological Resources

Surface disturbance under this alternative would be less than under the proposed program. Similarly, the reduced number of turbines would result in fewer avian and bat fatalities. Consequently, this alternative would have less severe impacts on biological resources than the proposed program.

Cultural Resources

Under this alternative, the likelihood of encountering a cultural resource during installation activities is slightly less than under the proposed program. Therefore, the impacts on cultural resources under this alternative would be similar to but slightly less than under the proposed program.

Geology, Soils, Mineral Resources, and Paleontological Resources

This alternative involves no changes that would reduce the potential impacts on geology and soils than would be associated with the proposed program. Therefore, impacts related to geology, soils, mineral resources, and paleontological resources under this alternative would be similar to those under the proposed program.

Greenhouse Gas Emissions

Under this alternative, GHG emissions resulting from decommissioning the existing windfarm facilities would be similar to those under the proposed program. However, because there would be fewer new turbines, the annual GHG emissions reduction would be less than under the proposed program. Accordingly, this alternative would have an impact similar to but slightly greater than that under the proposed program.

Hazards and Hazardous Materials

Under this alternative, the area of ground disturbance during installation would be less and there would be fewer turbines with the potential for blade throw hazard. However, construction workers and O&M workers would be exposed to the same types of hazards and hazardous materials as under the proposed program. Consequently, impacts associated with hazards and hazardous materials under this alternative would be similar to but slightly less than those under the proposed program.

Hydrology and Water Quality

Under this alternative, the potential for construction activities to result in increased erosion and discharge of sediment to surface waters would be reduced, as would the likelihood of the new turbines being placed in areas that would impede existing drainage patterns. Consequently, the impacts on hydrology and water quality under this alternative would be similar to but slightly less than those under the proposed program.

Land Use and Planning

Impacts under this alternative would be similar to those under the proposed program because both involve uses that are consistent with the existing land use plans, policies, and regulations.

Noise

Under this alternative, short-term noise impacts during construction would be similar to those under the proposed program. Because there would be fewer wind turbines, this alternative would generate less long-term operational noise. Accordingly, short-term impacts related to noise would be similar to those under the proposed program and long-term impacts related to noise would be less than those under the proposed program.

Population and Housing

The Fewer New Turbines alternative would require the same number of construction workers to decommission the existing facilities, but would require fewer workers for new construction and fewer O&M workers because there would be fewer turbines. Like the proposed program, this alternative would not create new jobs and would therefore not induce population growth or an increased demand for housing. Also like the proposed program, this alternative would not involve the demolition or displacement of any existing housing. Therefore, impacts under this alternative would be similar to but slightly less than those under the proposed program.

Public Services

Like the proposed program, this alternative would not result in substantial increases in demand for any public service. Therefore, public services impacts under this alternative would be similar to those under the proposed program.

Recreation

Like the proposed program, this alternative would not result in an increase in the use of existing neighborhood and regional parks and would not include recreational facilities. Therefore, recreation impacts under this alternative would be similar to those under the proposed program.

Traffic/Transportation

Under this alternative, the reduction in the number of new turbines could slightly reduce overall truck traffic. Consequently, impacts related to traffic and transportation under this alternative would be similar to or slightly less than those under the proposed program.

Utilities and Service Systems

This alternative would result in decommissioning, construction, and O&M activities similar to those under the proposed program. Consequently, impacts on water consumption, wastewater generation, stormwater drainage, and solid waste under this alternative would be similar to those under the proposed program.

4.2.4 Avoid Specific Biologically Sensitive / Constrained Areas

Aesthetics

This alternative would result in the same decommissioning of existing turbines and installation of the same number of turbines as the proposed program. Therefore, aesthetic impacts under this alternative would be similar to those under the proposed program.

Agricultural and Forestry Resources

This alternative would entail new turbines in the program area, with the potential to be located in areas of Prime Farmland or Farmland of Statewide Importance, thereby converting the land use to a nonagricultural use. Consequently, this alternative would require the same mitigation measure that would be required for the proposed program, and impacts related to agricultural and forestry resources would be similar to those under the proposed program.

Air Quality

This alternative would result in the same construction and operational air quality emissions as the proposed program. Accordingly, impacts related to air quality under this alternative would be similar to those under the proposed program.

Biological Resources

Because this alternative would avoid biologically sensitive areas, the impacts on terrestrial biological resources would likely be less than under the proposed program. Because the number and size of wind turbines would be the same, avian and bat mortality would likely be the same under this alternative as under the proposed program.

Cultural Resources

This alternative involves no changes that would reduce the potential impacts on cultural resources compared with the proposed program. Therefore, impacts related to cultural resources under this alternative would be similar to those under the proposed program.

Geology, Soils, Mineral Resources, and Paleontological Resources

This alternative involves no changes that would reduce the potential impacts on geology and soils compared with the proposed program. Consequently, impacts related to geology, soils, mineral resources, and paleontological resources under this alternative would be similar to those under the proposed program.

Greenhouse Gas Emissions

This alternative would result in the same construction and operational GHG emissions as the proposed program. Consequently, impacts related to GHG emissions under this alternative would be similar to those under the proposed program.

Hazards and Hazardous Materials

Under this alternative, construction and O&M workers would be exposed to the same types of hazards and hazardous materials as under the proposed program. Consequently, impacts on hazards and hazardous materials under this alternative would be similar to those under the proposed program.

Hydrology and Water Quality

This alternative involves no changes that would reduce the potential impacts on hydrology and water quality compared with the proposed program. Consequently, impacts related to hydrology and water quality under this alternative would be similar to those under the proposed program.

Land Use and Planning

Impacts under this alternative would be similar to those under the proposed program because both involve land uses that are consistent with the existing land use plans, policies, and regulations.

Noise

This alternative involves no changes that would reduce the potential impacts on noise compared with the proposed program. Therefore, impacts related to noise under this alternative would be similar to those under the proposed program.

Population and Housing

This alternative would require the same number of construction workers for decommissioning and installation and the same number of O&M workers because it would entail the same number of turbines as the proposed program. Like the proposed program, this alternative would not create new jobs and would therefore not induce population growth or an increased demand for housing. Also like the proposed program, this alternative would not involve the demolition or displacement of any existing housing. Consequently, impacts on population and housing under this alternative would be similar to those under the proposed program.

Public Services

Like the proposed program, this alternative would not result in substantial increases in demand for any public services. Accordingly, impacts related to public services under this alternative would be similar to those under the proposed program.

Recreation

Like the proposed program, this alternative would not result in an increase in the use of existing neighborhood and regional parks and would not include recreational facilities. Consequently, impacts related to recreation under this alternative would be similar to those under the proposed program.

Traffic/Transportation

This alternative involves no changes that would reduce the potential impacts on traffic and transportation compared with the proposed program. Therefore, impacts related to traffic and transportation under this alternative would be similar to those under the proposed program.

Utilities and Service Systems

Decommissioning and construction activities and O&M activities under this alternative would be similar to those under the proposed program. Consequently, impacts on water consumption, wastewater generation, stormwater drainage, and solid waste under this alternative would be similar to those under the proposed program.

4.2.5 No New Roads

Aesthetics

The No New Roads alternative would involve the use of helicopters to transport large equipment and turbine components to project sites for construction. The highly sensitive viewers in the program area (i.e., residents and recreationists) could perceive the presence of helicopters as a greater visual impact than would occur under the proposed program. Therefore, during construction, impacts on aesthetics under this alternative would be greater than those under the proposed program. Operational impacts would be similar to those under the proposed program, unless helicopters were also required for maintenance activities, in which case impacts would be greater.

Agricultural and Forestry Resources

Because this alternative would involve installation of new turbines in the program area, there would be potential for the new turbines to be located Prime Farmland or Farmland of Statewide Importance, thereby converting the land use to a nonagricultural use. Accordingly, this alternative would require the same mitigation measure that would be required for the proposed program, and impacts related to agricultural and forestry resources would be similar to those under the proposed program.

Air Quality

Air quality emissions associated with decommissioning activities under this alternative would be the same as under the proposed program. Because there would be no new roads, there would be no emissions from road construction. As previously described, because the new turbine towers and blades would be significantly longer than the existing turbine components, larger and longer trucks and cranes would be required for transport and installation. However, because existing roads would not accommodate the trucks required for construction of the repowered wind turbines, helicopters would be used to transport large equipment and turbine components to the program sites for construction. Emissions from helicopter use would be substantially higher than emissions from road construction and truck trips. Because construction emissions are significant and unavoidable under the proposed program, impacts related to air quality under this alternative would be similar to but greater than those under the proposed program.

Biological Resources

Because no new roads would be constructed under this alternative, the extent of ground-disturbing activities would be substantially reduced compared with the activities conducted under the proposed program. However, the level of avian and bat mortality would be the same as under the proposed program.

Cultural Resources

Because no new roads would be constructed under this alternative, the extent of ground-disturbing activities would be substantially reduced; consequently, the likelihood of encountering cultural resources would also be less. Accordingly, impacts related to cultural resources under this alternative would be similar to but less than those under the proposed program.

Geology, Soils, Mineral Resources, and Paleontological Resources

This alternative involves no changes that would reduce the potential impacts on geology and soils compared with those under the proposed program. Because no new roads would be constructed, impacts on paleontological resources could be less than those under the proposed program. Overall, impacts related to geology, soils, mineral resources, and paleontological resources under this alternative would be similar to but slightly less than those under the proposed program.

Greenhouse Gas Emissions

GHG emissions associated with decommissioning activities under this alternative would be the same as under the proposed program. Because there would be no new roads, there would be no emissions associated with road construction. GHG emissions from helicopters used to transport components and equipment would be substantially higher than emissions from road construction and truck trips. This alternative would result in the same reduction in annual GHG emissions as the proposed program, but GHG emissions associated with construction would be much greater. Therefore, impacts related to GHG emissions under this alternative would be greater than those under the proposed program.

Hazards and Hazardous Materials

Under this alternative, construction workers and O&M workers would be exposed to the same types of hazards and hazardous materials as under the proposed program. Therefore, impacts on hazards and hazardous materials under this alternative would be similar to those under the proposed program. However, because new roads would not be constructed, public service suppliers, particularly emergency vehicles, could have reduced access to the program area. Accordingly, this alternative would result in a greater impact on safety pertaining to fire hazards or other situations requiring first responders than would the proposed program.

Hydrology and Water Quality

Under this alternative, no new roads would be constructed and construction activities would be less likely to impede water quality or drainage. Therefore, impacts related to hydrology and water quality under this alternative would be similar to but less than those under the proposed program.

Land Use and Planning

Impacts under this alternative would be similar to those under the proposed program because both involve land uses that are consistent with the existing land use plans, policies, and regulations.

Noise

Under this alternative, because no new roads would be constructed, the new turbines would be transported to the program area using helicopters. Noise generated by helicopters is generally louder than noise generated by trucks. However, the mitigation measures required for the proposed program construction would apply to this alternative, and would reduce impacts from helicopter noise to a less-than-significant level. This alternative would also reduce the amount of noise associated with off-site truck traffic because there would be fewer trucks driving to and from the program area. Operational impacts of this alternative would be the same as those of the proposed program. Therefore, short-term impacts related to noise would be similar to but slightly greater than those under the proposed program, and long-term impacts on noise would be similar to those under the proposed program.

Population and Housing

The No New Roads alternative would require the same number of construction workers for decommissioning and installation activities and the same number of O&M workers because there would be same number of turbines. However, no workers would be needed for road infrastructure improvements because no new roads would be constructed. Like the proposed program, this alternative would not create new jobs and would therefore not induce population growth or an increased demand for housing. Also like the proposed program, this alternative would not involve the demolition or displacement of any existing housing. Accordingly, impacts on population and housing under this alternative would be similar to those under the proposed program.

Public Services

Like the proposed program, this alternative would not result in substantial increases in demand for any public service. Therefore, impacts on public services under this alternative would be similar to those under the proposed program.

Recreation

Like the proposed program, this alternative would not result in an increase in the use of existing neighborhood and regional parks and would not include recreational facilities. Therefore, impacts on recreation under this alternative would be similar to those under the proposed program.

Traffic/Transportation

Under this alternative, the larger pieces of turbine equipment would be transported to the program area by helicopter and there would be fewer truck trips during construction. However, some of the smaller trucks required for construction would still access the program area. Accordingly, the impacts on traffic and transportation under this alternative would be similar to but less than those under the proposed program.

Utilities and Service Systems

Decommissioning, construction, and O&M activities under this alternative would be similar to those under the proposed program. Impacts on water consumption, wastewater generation, stormwater drainage, and solid waste under this alternative would be similar to those under the proposed program.

4.3 Environmentally Superior Alternative

The State CEQA Guidelines require that an environmentally superior alternative be identified. The environmentally superior alternative is the alternative that would avoid or substantially lessen, to the greatest extent, the environmental impacts associated with the project while feasibly attaining most of the major project objectives. If the alternative with the least environmental impact is determined to be the *no project alternative*, the EIR shall also identify an environmentally superior alternative among the other alternatives.

The identification of the environmentally superior alternative results from a comparison of the impacts associated with each alternative to those of the proposed program, as shown in Table 4-2. No feasible alternatives would reduce the significant and unavoidable impacts of the project to a less-than-significant level. Of all of the alternatives evaluated, the No Project—No Repowering, Reauthorization of Existing CUPs alternative would have greater impacts on birds and bats, as older models of turbines would not be replaced with models that reduce bird and bat mortality. The Fewer New Turbines alternative would reduce overall impacts slightly, with the exception of GHG emissions. GHG impacts would be greater, as the benefits of full repowering would be reduced. The No New Roads alternative would reduce impacts associated with grading and road construction but would substantially increase impacts related to air pollutant and GHG emissions, as helicopters would be used for construction. The Avoid Specific Biologically Sensitive / Constrained Areas alternative would have the same impacts of either of the program alternatives, and could be implemented at either the 417MW or 450MW level, but would reduce the significant impacts associated with disturbance of biological resources at specific geographic locations. These impacts are not significant and unavoidable, as they can be reduced to a less-than-significant level by feasible mitigation measures identified in this EIR, but the impacts would be avoided under the Avoid Specific Biologically Sensitive / Constrained Areas alternative.

As shown in Table 4-2, the No Repowering, Full Decommissioning alternative would have the least environmental impacts of all the alternatives analyzed. For this reason, it would be the environmentally superior alternative.

Chapter 5

Other CEQA Considerations

This chapter includes the following other discussions and analyses required by CEQA.

- Significant and unavoidable environmental impacts.
- Growth-inducing impacts.
- Significant irreversible environmental impacts.
- Cumulative impacts.

5.1 Significant and Unavoidable Impacts

Section 21067 of CEQA and Sections 15126(b) and 15126.2(b) of the State CEQA Guidelines require that an EIR describe any significant impacts, including those that can be mitigated but not reduced to a less than significant level. Furthermore, where there are impacts that cannot be alleviated without imposing an alternative design, their implications and the reasons why the project is being proposed, notwithstanding their effect, should also be described. This PEIR has identified the following significant and unavoidable impacts.

- Air Quality: Construction emissions of ROG and NOX for program Alternatives 1 and 2 would exceed the BAAQMD thresholds after implementation of Mitigation Measures AQ-1 and AQ-2, (Table 3.3-11); accordingly, cumulative construction impacts would be significant and unavoidable. For the Golden Hills and Patterson Pass projects individually, construction emissions of NOX would exceed the BAAQMD thresholds after implementation of Mitigation Measures AQ-1 and AQ-2 (Tables 3.3-16 and 3.3-21); accordingly, cumulative construction impacts would be significant and unavoidable.
- Biological Resources: Operation of the either of the program alternatives, as well as the Golden Hills and Patterson Pass projects considered separately, would result in turbine-related mortality of raptors, other birds, and bats migrating through and wintering in the program area. Although mitigation can reduce these impacts, the likelihood of ongoing turbine-related mortality would constitute a significant and unavoidable impact.
- Cumulative Traffic Impacts: cumulative impacts on traffic operation, safety hazards, emergency access, and bicycle facilities could result from program and project construction activities if they take place concurrently with construction of the Sand Hill Repowering Project, which has been identified as resulting in a significant and unavoidable traffic impact.

5.2 Growth-Inducing Impacts

Section 21100(b)(5) of CEQA requires an EIR to discuss how a project, if implemented, may induce growth and the impacts of that induced growth (see also State CEQA Guidelines Section 15126). CEQA requires the EIR to discuss specifically “the ways in which the Project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment" (State CEQA Guidelines Section 15126.2[d]). The State CEQA Guidelines do not provide specific criteria for evaluating growth inducement and state that growth in any area is "necessarily beneficial, detrimental, or of little significance to the environment." CEQA does not require separate mitigation for growth inducement as it is assumed that these impacts are already captured in the analysis of environmental impacts (see Chapter 3, *Impact Analysis*). Furthermore, the State CEQA Guidelines require that an EIR "discuss the ways" a project could be growth inducing and to "discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment."

According to the State CEQA Guidelines, a project would have potential to induce growth if it would result in either of the following.

- Remove obstacles to population growth (e.g., through the expansion of public services into an area that does not currently receive these services), or through the provision of new access to an area, or a change in a restrictive zoning or General Plan land use designation.
- Result in economic expansion and population growth through employment opportunities and/or construction of new housing.

In general, a project could be considered growth-inducing if it directly or indirectly affects the ability of agencies to provide needed public services, or if it can be demonstrated that the potential growth significantly affects the environment in some other way. However, the State CEQA Guidelines do not require a prediction or speculation of where, when, and in what form such growth would occur (State CEQA Guidelines, Section 15145).

The potential growth-inducing impacts of the program and the Golden Hills and Patterson Pass projects are discussed below.

5.2.1 Remove Obstacles to Growth or Provide New Access

The program activities, including the Golden Hills and Patterson Pass projects, would include the construction of new service roads and electrical infrastructure. New service roads would be developed from existing main roads to access repower turbine sites. These roads would be privately owned and would be located within the program area boundary. The new roads would not extend outside of the program area or provide connection points for offsite development. Additionally, as repowering projects are implemented, old collection systems would be decommissioned and new collection systems would be installed. Each wind farm project would have its own electricity collection system with the exception of substations, which could be shared by multiple projects. Some equipment would be replaced while some would be removed and not replaced. The new electrical infrastructure would be located within the program area and would transfer power generated by the wind turbines to the regional electrical grid. More importantly, the new roads and electrical infrastructure would only serve an approved program of repowering, and because of growth and development controls embedded in the East County Area Plan, no additional uses (e.g., housing, industry or commercial activity) that is not already allowed in the program area would be enabled. Therefore, the program would not be expected to indirectly induce population growth through the construction of new service roads or electrical infrastructure.

For the Golden Hills and Patterson Pass projects, the potential for growth inducement would be similar to the program but of a smaller scale. Therefore, the Golden Hills and Patterson Pass projects would not be expected to indirectly induce population growth through the construction of new service roads or electrical infrastructure.

5.2.2 Economic, Population, and Housing Growth

Typically, the growth-inducing potential of a project is considered significant if it fosters growth or a concentration of population in a different location or in excess of what is assumed in pertinent general plans or land use plans, or projections made by regional planning agencies, such as the Association of Bay Area Governments (ABAG). Section 3.12 of this PEIR, *Population and Housing*, analyzes the proposed program's overall effect on population, including growth-inducement. The proposed program does not include the construction or demolition of any housing, and so would not have a direct impact on population or housing growth. Construction of the proposed program would result in a short-term increase in construction-related job opportunities in the Alameda County region. However, construction workers can be expected to be drawn from the existing construction employment labor force. Therefore, opportunities provided by construction of the proposed program would not likely result in the relocation of construction workers to the program region. Therefore, the employment opportunities provided by construction are not anticipated to induce indirect growth in the region.

For the Golden Hills and Patterson Pass projects, the potential for growth inducement would be similar but of a smaller scale. Therefore, the employment opportunities provided by construction of the Golden Hills and Patterson Pass projects are not anticipated to induce indirect growth in the region.

5.3 Significant Irreversible Environmental Changes

State CEQA Guidelines Section 15126.2(c) requires that an EIR discuss any environmental changes that would be irreversible if a project were implemented. CEQA defines irreversible environmental changes as the irretrievable commitment of resources and/or irreversible damage resulting from environmental accidents. Irreversible changes may include current or future uses of non-renewable resources, and secondary or growth inducing impacts that commit future generations to similar uses. The State CEQA Guidelines describe three distinct categories of significant irreversible changes, including changes in land use that would commit future generations to specific uses; irreversible changes from environmental actions; and consumption of nonrenewable resources.

5.3.1 Changes in Land Use Which Would Commit Future Generations

The program area and the Golden Hills and Patterson Pass project sites, which fall within the program area, are located in eastern Alameda County. The area is currently the location of extensive wind farm development. The *East County Area Plan* designates the entire program area as Large Parcel Agriculture (LPA). According to the *East County Area Plan*, a wind farm is a permitted use with a CUP. The program and the Golden Hills and Patterson Pass projects would not commit future generations to or introduce changes in land use that would vary from the existing conditions.

5.3.2 Irreversible Changes from Environmental Actions

The program involves the construction and repowering of existing wind farms on approximately 50,000 acres in unincorporated eastern Alameda County. The commitment of nonrenewable resources, such as sand, gravel and other components of cement, metals and fossil fuels, necessary for construction and operation of the repowered wind farm would be irreversible.

5.3.3 Consumption of Nonrenewable Resources

Construction of repowered wind farms would require the consumption of nonrenewable resources, such as fuel for construction vehicles and equipment. However, such use would be limited to the short-term construction period. Operation and maintenance of the proposed program and projects would not increase the use of nonrenewable resources relative to existing conditions. The temporary, construction-related increase would not result in significant use of nonrenewable resources and would not commit future generations to similar uses. Moreover, the primary objective of the program, as well as of the Golden Hills and Patterson Pass projects, is to provide an economically viable source of clean, renewable electricity generation that meets California's growing demand for power and fulfills numerous State and national renewable energy policies. The intent is to specifically reduce consumption of non-renewable sources of energy such as coal, natural gas and other hydrocarbon-based fuels.

5.4 Cumulative Impacts

5.4.1 Approach to Impact Analysis

Legal Requirements

State CEQA Guidelines require that the cumulative impacts of a project be addressed in an EIR when the cumulative impacts are expected to be significant and when the project's incremental effect is cumulatively considerable (State CEQA Guidelines Section 15130[a]). Cumulative impacts are impacts on the environment that result from the incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions (State CEQA Guidelines Section 15355[b]). Such impacts can result from individually minor but collectively significant actions taking place over time.

Section 15130 of the State CEQA Guidelines states that the discussion of cumulative impacts need not provide as much detail as the discussion of effects attributable to the project alone. The level of detail should be guided by what is practical and reasonable.

Methodology

According to the State CEQA Guidelines, an adequate discussion of significant cumulative impacts should contain the following discussions.

- An analysis of related future projects or planned development that would affect resources in the project area similar to those affected by the project.

- A summary of the expected environmental effects to be produced by those projects, with specific reference to additional information stating where that information is available.
- A reasonable analysis of the cumulative impacts of the relevant projects.

An EIR must examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative impacts.

When evaluating cumulative impacts, CEQA recommends one of the following two methods.

1. Projects to consider in the cumulative analysis include any past, present, and probable future projects producing related or cumulative impacts, including projects outside the control of the lead agency (i.e., project list approach).
2. The cumulative analysis would consider projections contained in an adopted local, regional, or statewide plan, or would use a prior environmental document which has been adopted or certified for such a plan (i.e., plan approach).

Additionally, the cumulative background may differ for each resource (water-type projects for effects related to fish may differ from traffic-type projects for effects related to traffic, air, and noise). The California Supreme Court, in Ebbetts Pass Forest Watch v. California Department of Forestry and Fire Protection (2008) 43 Cal. 4th 936, acknowledged that the area subject to cumulative impact analysis may differ from resource to resource. Although that decision dealt with CDF's certified regulatory program, the principles set forth in it are applicable to CEQA in general (see also Environmental Protection and Information Center v. California Department of Forestry and Fire Protection (2008) 44 Cal. 4th 459).

This analysis is based on a combination of the plan/projections and list approaches, using the land use designations of the ECAP in combination with known other relevant projects in the APWRA area. The primary ECAP land designation in the program area is Large Parcel Agriculture, which allows low intensity agriculture and grazing, related uses and residential and residential accessory uses not more than 12,000 square feet floor area with a 100-acre minimum parcel size. The dominant land uses are wind energy generation, agriculture, and cattle grazing. The rural-residential districts on Dyer and Midway Roads are separate, small rural communities.

The spatial boundary for the study of a cumulative impact varies depending on the resource of concern. For example, impacts related to geology and archeological resources are generally site specific, while air and noise impacts can encompass larger areas. Most of the impacts are site-specific and limited in terms of geography, and do not have the ability to compound impacts from past, existing or future projects beyond the program area. In these circumstances, CEQA directs that it is not necessary to address in detail the impacts from other projects:

> "[w]here a lead agency is examining a project with an incremental effect that is not 'cumulatively considerable,' a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable" (CEQA Guidelines, §15130, subd. [a]); and
>
> "[a]n EIR should not discuss impacts which do not result in part from the project evaluated in the EIR" (State CEQA Guidelines Section 15130 subd. [a][1]).

5.4.2 Analysis of Cumulative Impacts

The description below presents the cumulative background used for the assessment of cumulative impacts for specific topical areas as well as an assessment of cumulative impacts and the contribution to those impacts by the program. Given the nature of a cumulative analysis, the contribution of the program would encompass the contribution of the specific projects. Where the contribution of a specific project would differ from that of the program, this is specifically described.

Aesthetics

The geographic scope considered for potential cumulative impacts on visual/aesthetic resources is the viewshed of the public and recreational users common to the program area. Within the viewshed of the program area and project sites, the Vasco Wind project, in combination with the proposed program and projects, could contribute to cumulative impacts on visual/aesthetic resources. The Vasco Wind Repowering Project is located adjacent to the northern boundary of the program area in Contra Costa County. The Vasco Winds Repowering Project extends horizontally from north of Brushy Peak Regional Preserve to approximately 1 mile west of the California aqueduct extending to Bethany Reservoir.

Repowering Program

The widely spaced distribution of the new, larger Repowering Program turbines detracts less from the natural landscape than the existing string configuration (Figures 3.1-3 to 3.1-7) and de-clutters the hillsides and ridgelines compared to the smaller turbines that are closer together and installed in higher densities. This configuration allows for views of the rolling, grassy terrain to become more cohesive and prominent and less interrupted by anthropogenic features.

The Vasco Wind Repowering Project could affect views from Vasco Road, which is a County-designated scenic route where no turbines currently exist in Alameda County. A portion of Vasco Road is located in the northwestern corner of the program area boundary (Figure 3.1-2). Therefore, the proposed program could contribute to a cumulatively considerable impact on this County-designated scenic route. However, existing Alameda and Contra Costa County policies would prevent the program from contributing to a cumulatively significant impact.

When considered with the Vasco Wind Repowering Project, the program could contribute to a cumulatively considerable impact on visual character where no turbines exist near the northern boundary of the program area. However, Alameda County Policy ECAP 105, together with Mitigation Measures AES-2a, AES-2b, AES-c, AES-3, and AES-5, would prevent the proposed program from contributing to a cumulatively considerable impact.

In addition, cumulative impacts on daytime and nighttime views resulting from light and glare would be less than significant for the proposed program through compliance with existing Alameda County policies and measures included in the program, and cumulative impacts on daytime and nighttime views for the Vasco Winds Repowering Project would be reduced to a less-than-significant level with implementation of Mitigation Measure AES-5. Therefore, construction of both projects would not result in a cumulatively considerable impact because the combined impacts of the two projects would not create a new source of light, glare, or shadow flicker experienced by residents and businesses of sufficient magnitude that day or nighttime views in the area would be substantially degraded.

Golden Hills Project

The Vasco Wind Repowering Project is within 5 miles of the Golden Hills project area. The widely spaced distribution of the new, larger turbines detracts less from the natural landscape than the existing string configuration (Figures 3.1-3 to 3.1-7) and de-clutters the hillsides and ridgelines compared to the smaller turbines that are closer together and installed in higher densities. This configuration allows for views of the rolling, grassy terrain to become more cohesive and prominent and less interrupted by anthropogenic features but could introduce large, visually obtrusive turbines within the viewsheds of scenic vistas and scenic roadways. However, Alameda County Policy ECAP 105, together with AES-2a, AES-2b, AES-2c, AES-3, and AES-5, would prevent the Golden Hills Project from contributing to a cumulatively considerable impact.

In addition, cumulative impacts to daytime and nighttime views resulting from light and glare would be less than significant for the Golden Hills Project due to existing Alameda County policies and measures included in the project, and cumulative impacts on daytime and nighttime views for the Vasco Winds Repowering Project would be reduced to a less-than-significant level with implementation of Mitigation Measure AES-5. Construction of both projects would not result in a cumulatively considerable impact because the combined impacts of the two projects would not create a new source of light, glare, or shadow flicker experienced by residents and businesses of sufficient magnitude that day or nighttime views in the area would be substantially degraded.

Patterson Pass Project

The Patterson Pass Project is approximately 6.4 miles south of the northern program area boundary, and the Vasco Wind Repowering Project is north of this northern boundary. The widely spaced distribution of the new, larger turbines detracts less from the natural landscape than the existing string configuration (Figures 3.1-3 to 3.1-7) and de-clutters the hillsides and ridgelines in contrast with the smaller turbines that are closer together and installed in higher densities. This configuration allows for views of the rolling, grassy terrain to become more cohesive and prominent and less interrupted by anthropogenic features but could introduce large, visually obtrusive turbines within the viewsheds of scenic vistas and scenic roadways. However, Alameda County Policy ECAP 105, together with AES-2a, AES-2b, AES-2c, AES-3, and AES-5, would prevent the Patterson Pass Project from contributing to a cumulatively considerable impact.

Agricultural and Forestry Resources

The program area contains 24.21 acres of Prime Farmland and 0.36 acre of Farmland of Statewide Importance. Mitigation Measure AG-1 would ensure that no Prime Farmland or Farmland of Statewide Importance is converted to nonagricultural use. Because the program would not result in any impacts on farmland or forestry resources, it would not result in or contribute to a cumulatively considerable impact.

Air Quality

The BAAQMD has identified project-level thresholds to evaluate criteria pollutant impacts (Section 3.2). In developing these thresholds, the BAAQMD considered levels at which project emissions would be cumulatively considerable. As noted in their CEQA Guidelines (2011a),

> In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, additional analysis to assess cumulative impacts is unnecessary.

The criteria pollutant thresholds presented in Section 3.2 therefore represent the maximum emissions the program may generate before contributing to a cumulative impact on regional air quality. Therefore, as noted in Section 3.3, *Air Quality*, projects that would result in an increase in ROG, NOX, PM10, or PM2.5 of more than their respective project-level daily mass thresholds indicated in Table 3.3-5 would also be considered to contribute considerably to a significant cumulative impact.

Operation of the program Alternative 1, program Alternative 2, the Golden Hills Project, and the Patterson Pass Project would not result in new permanent stationary sources of criteria pollutants, nor would operation increase criteria pollutant emissions from any existing stationary sources. No new permanent workers would be employed under any the Program alternatives or the two projects, and inspections and scheduled wind turbine maintenance would continue to occur as under existing conditions. Daily emissions of criteria pollutants associated with these activities are anticipated to be unchanged and would not be considered to result in a significant contribution to existing air quality violations.

Construction emissions of ROG and NOX for program Alternative 1 and program Alternative 2 are greater than the BAAQMD thresholds after the implementation of Mitigation Measures AQ-1 and AQ-2, (Table 3.3-11), and therefore cumulative construction impacts are significant and unavoidable. For the Golden Hills Project and the Patterson Pass Project, construction emissions of NOX would be greater than the BAAQMD thresholds after the implementation of Mitigation Measures AQ-1 and AQ-2, (Tables 3.3-16 and 3.3-21), and therefore cumulative construction impacts would be significant and unavoidable.

Biological Resources

Program

The analysis of cumulative impacts on biological resources was carried out at two geographic scales. Construction-related impacts, which would largely pertain to disturbance and potential loss of land cover types and the associated effects on special-status terrestrial species, were considered in the context of the northern Diablo Range. Cumulative impacts associated with avian and bat fatalities through turbine collision were considered in the context of the entire APWRA (both Alameda and Contra Costa Counties) as well as the Montezuma Hills Wind Resource Area in neighboring Solano County.

Implementation of either program alternative could result in the permanent loss of vegetation and wetlands. Compensation for the loss of vegetation and wetlands would mitigate those impacts with the goal of no net loss. It is expected that each project implemented under the program would be required to mitigate losses vegetation and wetlands, resulting in no net loss, and thereby reducing any contribution to cumulative impacts to a less-than significant level.

Implementation of the program could result in the injury, mortality, or disturbance of special-status and common wildlife species during construction, with the potential to affect local populations.

Implementation of mitigation measures identified in this PEIR would minimize or avoid injury, mortality, or disturbance of special-status and common species during construction, and would avoid or reduce the program's contribution to cumulative effects on local populations.

The program would result in the permanent and temporary losses of land cover types that provide suitable habitat for special-status and common wildlife species. The loss of these habitats would contribute to impacts of other projects that remove these habitats in the program region. However, permanent disturbance of undeveloped land would be offset by restoration of habitat when existing roads and turbine pads and foundations are restored to natural conditions. With this offset, and with implementation of mitigation measures identified in this PEIR that require restoration of temporarily affected habitat and compensation for the permanent loss of habitat, the program's contribution to cumulative impacts would be reduced to a less-than-significant level.

Avian and bat mortality associated with turbine collisions has been identified as a significant and unavoidable impact. By definition, and considered with other sources of avian mortality (e.g., the Contra Costa County portion of the APWRA and the neighboring Montezuma Hills Wind WRA), this would constitute a considerable contribution to a significant cumulative impact.

Golden Hills Project

Construction of the Golden Hills project could result in the permanent loss of vegetation and wetlands. Mitigation for these effects, implemented with the goal of no net loss, would reduce the contribution to cumulative impacts to a less-than-significant level.

Construction of the proposed project could result in the injury, mortality, or disturbance of special-status and common wildlife species during construction, with the potential to affect local populations. Implementation of mitigation measures identified in this PEIR would minimize or avoid injury, mortality, or disturbance of special-status and common species during construction, and would avoid or reduce the project's contribution to cumulative effects on local populations.

The proposed project would result in the permanent and temporary losses of land cover types that provide suitable habitat for special-status and common wildlife species. The loss of these habitats would contribute to impacts of other projects that remove these habitats in the project region. However, permanent disturbance of undeveloped land would be offset by restoration of habitat when existing roads and turbine pads and foundations are restored to natural conditions. With this offset, and with implementation of mitigation measures identified in this PEIR that require restoration of temporarily affected habitat and compensation for the permanent loss of habitats, the project's contribution to cumulative impacts would be reduced to a less-than-significant level.

Avian and bat mortality associated with turbine collisions has been identified as a significant and unavoidable impact. By definition, and considered with other sources of avian mortality (e.g., the Contra Costa County portion of the APWRA and the neighboring Montezuma Hills Wind WRA), this would constitute a considerable contribution to a significant cumulative impact.

Patterson Pass Project

Construction of the Patterson Pass Project could result in the permanent loss of vegetation and wetlands. Mitigation for these effects, implemented with the goal of no net loss, would reduce the contribution to cumulative impacts to a less-than-significant level.

Construction of the proposed project could result in the injury, mortality, or disturbance of special-status and common wildlife species during construction, with the potential to affect local populations. Implementation of mitigation measures identified in this PEIR would minimize or avoid injury, mortality, or disturbance of special-status and common species during construction, and would avoid or reduce the project's contribution to cumulative effects on local populations.

The proposed project would result in the permanent and temporary losses of land cover types that provide suitable habitat for special-status and common wildlife species. The loss of these habitats would contribute to impacts of other projects that remove these habitats in the project region. However, permanent disturbance of undeveloped land would be offset by restoration of habitat when existing roads and turbine pads and foundations are restored to natural conditions. With this offset, and with implementation of mitigation measures identified in this PEIR that require restoration of temporarily affected habitat and compensation for the permanent loss of habitats, the project's contribution to cumulative impacts would be reduced to a less-than-significant level.

Avian and bat mortality associated with turbine collisions has been identified as a significant and unavoidable impact. By definition, and considered with other sources of avian mortality (e.g., the Contra Costa County portion of the APWRA and the neighboring Montezuma Hills Wind WRA), this would constitute a considerable contribution to a significant cumulative impact.

Cultural Resources

The geographic scope of potential cumulative effects with respect to cultural resources is usually limited to areas within the physical footprint of a proposed project. With the implementation of the mitigation measures presented in this EIR, the proposed program could have a less-than-significant impact on historic resources, archaeological resources, and human remains.

Simultaneous construction of multiple repowering projects in the program area and other development and infrastructure projects in the vicinity of the program area could potentially result in significant impacts on historic resources, archaeological resources, and human remains, should they be present within the program area or the vicinity of the program area. However, implementation of mitigation measures identified in this EIR will ensure that impacts would not be such that they would result in or contribute to a cumulative impact.

Geology, Soils, Mineral Resources, and Paleontological Resources

Construction in a seismically active region puts people and structures at risk from a range of earthquake-related effects, particularly seismic ground shaking and landsliding in the project area. However, as discussed above, various mechanisms are in place to reduce seismic-related risk, including mitigation measures and project-specific geotechnical investigation and seismic design standards promulgated by the county building codes. Neither the proposed program as a whole nor the Golden Hills and Patterson Pass projects would contribute considerably to the existing cumulative impact related to seismic hazards. The geographic scope of potential cumulative effects with respect to paleontological resources is usually limited to areas within the physical footprint of a proposed project. With the implementation of the mitigation measures presented in this EIR, the proposed program could have a less-than-significant impact on paleontological.

Simultaneous construction of multiple repowering projects in the program area and other development and infrastructure projects in the vicinity of the program area could potentially result in significant impacts on paleontological resources, should they be present within the program area or the vicinity of the program area. However, implementation of the mitigation measures to protect paleontological resources identified in this EIR will ensure that impacts would not be such that they would result in or contribute to a cumulative impact.

Greenhouse Gas Emissions

GHG emissions are inherently a cumulative concern, in that the significance of GHG emissions is determined based on whether such emissions would have a cumulatively considerable impact on global climate change. Although the geographic scope of cumulative impacts related to GHG emissions is global, this analysis focuses on the state, the region, and this program's direct and/or indirect generation or offset of GHG emissions. The proposed program, the Golden Hills Project, and the Patterson Pass Project would result in a long-term net reduction of approximately 96,049 metric tons of CO_2e per year, 18,727 metric tons of CO_2e per year, and 6,204 metric tons of CO_2e per year, respectively, and would not conflict with the State's GHG reduction goals. Therefore, the project-specific incremental impact on GHG emissions resulting from the program or from either of the two projects would not be cumulatively considerable.

Hazards and Hazardous Materials

Potential cumulative hazards and hazardous materials impacts are generally site-specific and depend on past, present, and future uses and existing soil, sediment, and conditions. The geographic scope of potential cumulative impacts relating to wildland fires includes the high fire hazard areas in which access and haul roads would be shared throughout the APWRA and other projects being constructed at the same time. The background for the cumulative analysis included existing windfarms including: Golden Hills Project, Patterson Pass, Summit, AWI, Vasco, FloDesign Wind Turbine Corp. These projects, together with the existing old-generation windfarm facilities and the proposed Mariposa Energy Center and Cool Earth Solar Energy Facility near Mountain House.

The project would contribute less-than-significant impacts related to accidental releases of hazardous materials; interference with air navigation; or flammable or combustible materials. There is no evidence of existing subsurface conditions that would potentially contribute to cumulative impacts relating to hazards and hazardous materials. No records exist indicating that contaminated sites or hazardous substances are located in areas to be disturbed. The program and all cumulative projects would be required to adhere to regulations that govern hazardous materials storage and handling, water quality BMPs, FAA regulations related to airspace, and fire prevention and management. Together, these measures would ensure that impacts related to exposure to hazardous materials would be minimized and/or avoided. Therefore, the project's incremental, less-than-significant impacts in these areas would not be cumulatively considerable.

Hydrology and Water Quality

The geographic scope considered for potential cumulative impacts related to Hydrology and Water Quality included the Brushy Creek, Clifton Court Forebay, Mountain House Creek, Lower Old River, Lower Corral Hollow Creek, and Upper Corral Hollow Creek watersheds which flow generally east toward the Central Valley and a narrow strip along the western portion of the program area—comprising the Upper Arroyo Las Positas and Arroyo Seco watersheds that drains west toward the San Francisco Bay region. For groundwater resources, the area considered was the Tracy Subbasin.

Impacts associated with implementation of the repowering program would be less than significant with compliance with NPDES requirements. Other projects in the same watersheds would also be required to comply with NPDES requirements, ensuring that significant impacts would not occur. There would be no impacts associated with implementation of the repowering program related to flooding, and therefore the repowering program could not contribute to any cumulative impact related to flooding.

Land Use and Planning

Because the proposed program and projects would not result in any impacts on land use, it would not result in or contribute to a cumulatively considerable effect.

Noise

The cumulative noise analysis considers the construction and operation of other repowering projects in the program area vicinity that could cumulatively contribute to the ambient noise environment at the existing residences near the existing and proposed turbine sites in the program area. For construction noise impacts, the analysis considers the cumulative impacts at existing residences near the construction activities from construction of multiple repowering projects simultaneously in the program area. Because noise diminishes rapidly with distance (6 dBA per doubling of distance for point sources), the noise analysis evaluates impacts at existing residences in areas immediately surrounding the project turbine sites and construction activities.

The implementation of the repowering program along with other repowering projects in the vicinity of the program area would replace the majority of existing turbines with fewer and larger modern turbines. The modern turbines are expected to have several characteristics that reduce aerodynamic sound levels and make for quieter operations than the existing turbines. The modern turbines are expected to have relatively low rotational speeds and pitch control on the rotors, both of which reduce sound levels.

Nonetheless, the analysis provided above at both the program and project level indicates that there is potential for repowering projects to result in noise that exceeds County noise standards which would result in significant cumulative operational noise impacts. Implementation of Mitigation Measure NOI-1, however, would ensure compliance with County noise standards and would avoid significant cumulative operational noise impacts.

Construction of multiple repowering projects simultaneously in the program area could potentially result in a cumulative construction noise impact at residences located near the construction activities. However, the impact would be temporary and localized and implementation of Mitigation Measure NOI-2 would reduce cumulative impacts to a less-than-significant level.

Population and Housing

Because the proposed program would not result in any impacts related to population and housing, it would not contribute to any cumulative impacts.

Public Services

Because the proposed program would not result in any impacts on public services, it would not contribute to any cumulative impacts.

Recreation

Because the program and the Golden Hills and Patterson Pass Projects would have no impact on Recreation, it would not contribute to any cumulative impacts related to recreation.

Transportation/Traffic

The cumulative traffic analysis considers the other projects in the program area vicinity that would involve construction activities concurrently with those of the proposed projects and that could use the same access roadways to the project areas, creating the potential to cumulatively degrade the traffic operation, bicycle facilities, and safety condition on the local access roads in the vicinity of the proposed projects. The traffic impacts associated with the program and two individual projects are mostly caused by the construction traffic and activities. Once the turbines are installed and in operation, maintenance needs would be limited and not substantially greater than currently required; postconstruction traffic generation would not differ materially from current maintenance traffic levels. Accordingly, cumulative traffic analysis concentrated on construction activities.

Construction of multiple repowering projects simultaneously in the program area and other development and infrastructure projects in the vicinity of the program area could potentially result in cumulative construction traffic impacts on freeways and county roadways used for haul routes and worker access to the project sites. The cumulative construction impacts on traffic operation, safety hazards, emergency access, and bicycle facilities would be similar to the impacts discussed in Section 3.15.2 and are considered to be significant. Implementation of Mitigation Measure TRA-1 would reduce the program's cumulative contribution to the significant impact. The mitigation includes implementation of circulation and detour plans, installing traffic control devices, scheduling, to the extent feasible, truck and worker trips outside of peak commute hours, and coordination of project construction activities with the affected agencies to identify and minimize overlap with other area construction projects. However, because the construction activities and associated traffic from the Sand Hill Repowering Project in the program area is expected to result in a significant and unavoidable traffic impact, any proposed repowering projects with the construction activities taking place concurrently with construction of the Sand Hill Repowering Project would contribute to a significant and unavoidable cumulative impact on traffic operation, safety hazards, emergency access, and bicycle facilities on the roadway and bicycle facilities in the vicinity of the Sand Hill Repowering Project.

Utilities and Service Systems

The program and proposed projects consist of operational modifications to existing wind turbine facilities and subsequent turbine removal and site reclamation, and would not create a need for the construction or expansion of utilities and service systems. In addition, there is no existing water service onsite, and the project would not cause a need for water service. The program area is located entirely in a rural setting; stormwater runoff drains primarily through natural drainage swales, ditches, and watercourses. No construction or expansion of wastewater systems would be required there would be no connections to a public sewer system. The proposed program would also not generate a substantial amount of solid waste because turbines and components will be sold or recycled. For these reasons, projects resulting in a significant increase in demand for public services would not be consistent with the existing ECAP land use designations and policies for the program area, and therefore no cumulative impact is likely to occur. Therefore, it is not anticipated that the proposed program could make a considerable contribution to any cumulative impacts on utilities or services such as wastewater, water supply, or solid waste.

Chapter 6
Report Preparers

The CEQA Lead Agency is the County of Alameda. This EIR was prepared on the Lead Agency's behalf by ICF International. This chapter lists the individuals who prepared the report.

6.1 ICF International

6.1.1 Project Management

Project Director	Chris Brungardt
Project Manager	Sally Zeff, AICP, and Kathryn Gaffney
Project Coordinator	Elizabeth Antin

6.1.2 Technical Analyses

Aesthetics	Jen Stock, PLA, Shannon Hill
Agricultural and Forestry Resources	Lindsay Christensen
Air Quality	Brian Schuster, Shannon Hatcher
Biological Resources	Jennifer Haire (Wildlife), Kailash Mozumder (Wildlife), Rob Preston, PhD (Botany), Rachel Gardiner (Avian), Leila Harris (Bats), Doug Leslie (Avian)
Cultural Resources	Aisha Fike (Historic Architecture), Ed Yarbrough, AIA (Historic Architecture), Jessica Feldman (Historic Architecture), Joanne Grant, RPA (Archaeology), Alisa Reynolds (Archaeology)
Geology, Soils, Minerals, and Paleontology	Ellen Unsworth, ELS
Greenhouse Gas Emissions and Climate Change	Brian Schuster, Shannon Hatcher
Hazards and Hazardous Materials	Tina Sorvari
Hydrology and Water Quality	Nate Martin
Land Use and Planning	Lindsay Christensen
Noise	Kai-Ling Kuo, PE, Dave Buehler, PE
Population and Housing	Elizabeth Antin
Public Services	Lindsay Christensen

Recreation	Lindsay Christensen
Transportation and Circulation	Kai-Ling Kuo, PE
Utilities and Service Systems	Lindsay Christensen
Alternatives	Elizabeth Antin
Other CEQA-Required Sections	Elizabeth Antin
Editing	Larry Goral, Tami Mihm, Teresa Giffen
Graphics	Tim Messick
GIS	Kasey Allen
Document Production	Corrine Ortega, Jody Job

Appendix A
Existing Wind Projects in the APWRA

Appendix A-1. Existing Conditional Use Permits in the APWRA

CUP Number	Windfarm Size (MW)	Number of Turbines	Assessor's Parcel Number	Wind Company	Land Owner
C-8161	2.89	38	099B-7750-006-00	SeaWest Power Resources LLC	Pombo
C-8191	4.0	16	099B-7910-001-01	Windworks	Mulqueeny
C-8201	3.38	52	099B-7875-001-02; 099B-7875-001-03	SeaWest Power Resources LLC	Griffith & Brockman
C-8203	8.52	131	099B-7500-003-01; 099B-7600-001-01	SeaWest Power Resources LLC	Arnaudo & Castello
C-8233	2.6	26	099B-6125-004-00	Altamont Infrastructure Company	Elliott
C-8234	2.4	27	099A-1790-001-00	Altamont Infrastructure Company	Ralph Properties II
C-8235	6.1	40	099A-1785-001-13	Altamont Infrastructure Company	Corbett
C-8236	3.4	34	099B-5658-001-00	Altamont Infrastructure Company	Dunton
C-8237	13.6	136	099B-5610-001-00; 099B-6075-003-00	Altamont Infrastructure Company	Alhalla Enterprises
C-8238	23.8	238	099B-7375-001-07; 099B-7300-001-05; 099B-325-001-03	Altamont Infrastructure Company	Ralph Properties II
C-8239	3.0	30	099B-6125-005-00	Altamont Infrastructure Company	Jackson
C-8241	23.8	238	099B-6100-002-10; 099B-6100-002-11; 099B-6100-003-01; 099B-6100-003-11	Altamont Infrastructure Company	Walker Family Trust
C-8242	17.5	175	099B-6150-002-07; 099B-6150-003-00; 099B-6150-004-10	Altamont Infrastructure Company	Marie Gomes Farms
C-8244	17.5	175	099B-1795-001-00; 099A-1790-002-00; 099B-6425-002-03	Altamont Infrastructure Company	Marie Gomes Farms
C-8023	2.4	30	099B-6325-001-04	Seawest Power Resources LLC	Johnston
C-8031	5.46	47	099B-1810-001-00; 099B-1770-002-01; 099B-1770-002-02; 099B-1770-002-03	Altamont Power Company	Corbett
C-8036	0.7	7	099B-5680-015-00	Altamont Infrastructure Company	Frick
C-8037	6.5	65	099B-6300-002-01; 099B-6300-002-02; 099B-6325-002-03; 099B-6325-002-04; 099B-6325-001-06	Altamont Infrastructure Company	Pombo
C-8134	3.1	31	099B-6125-002-00	Altamont Infrastructure Company	Rooney

CUP Number	Windfarm Size (MW)	Number of Turbines	Assessor's Parcel Number	Wind Company	Land Owner
C-8136	0.17	17	099B-6100-002-07	Altamont Infrastructure Company	Contra Costa Water District
C-8137	70	697	099A-1800-002-03; 099A-1800-002-04; 099B 7890-002-04; 099B-7890-002-05; 099B-7900-001-05; 099B-7900-001-07; 099B-7910-001-01; 099B-7925-001-03; 099B-7925-001-04; 099B-7925-002-04; 099B-7925-002-05; 099B-7975-001-00; 099B-7980-001-00; 099B-7985-001-03; 099B-7985-001-04; 099B-7985-001-05; 099B-7985-001-06; 099B-8050-001-00	Altamont Infrastructure Company	Mulqueeney
C-8173	0.9	9	099B-7890-001-03	Altamont Infrastructure Company	Wildlands, Inc.
C-8182	8.23	182	099B-6325-001-03	Seawest Power Resources, LLC	Ralph Properties II
C-8224	37.92	291	099B-6130-002-00; 099B-6130-003-00; 099B-6175-001-01; 099B-6175-002-03	Altamont Power Company	Elworthy
C-8225	3.1	10	099B-5650-002-01	Altamont Infrastructure Company	Guo & Lin
C-8231	26.77	260	099B-6062-003-00; 099B-6062-005-00; 099B-6225-001-00; 099B-6250-001-00; 099B-6275-001-01; 099B-6300-004-01	Altamont Infrastructure Company	Altamont Landfill – Waste Management Inc.
C-8232	5.0	50	099B-6125-003-00	Altamont Infrastructure Company	Egan
C-8240	1.2	12	099B-5650-002-04	Altamont Infrastructure Company	Hansen
C-8263	21.8	336	099A-1800-001-00; 099A-1800-002-01; 099B-7985-001-02	Enxco, Inc.	Patterson Pass Farms-Fields

Appendix A-2. Existing Turbines in the Altamont Pass Wind Resource Area

Company	Project Site	Turbine Model	Generation	Tower Type	Tower Height (m)	Turbine Height (m)	Rotor Diameter (m)	Rotor-Swept Area (m²)	Cut-in Speed (m/s)	Turbine Rated Capacity (kW)	Existing Turbines (#)	Removed Turbines (#)	Total Turbines (#)	Existing Turbines Rated Capacity (MW)	Removed Turbines Rated Capacity (MW)	Total Historic Rated Capacity (MW)
Alameda County																
AES SeaWest	Altech I	Enertech	1/2	Lattice	18.3	25.9	13.4	141.3	4	40	133	11	144	5.3	0.4	5.8
	ESI (Johnson)	Enertech	1/2	Lattice	18.3	25.9	13.4	141.3	4	40	0	26	26	0.0	1.0	1.0
	Santa Clara	Vestas (V-17)	1/2	Lattice	24.4	32.9	17.1	228.8	4	95	199	3	202	18.9	0.3	19.2
	Swamp (TV 11 & 12)	Micon	1/2	Tubular	24.4	32.3	15.8	197.3	4	65	11	1	12	0.7	0.1	0.8
	Taxvest (AC/GB)	Micon	1/2	Tubular	24.4	32.3	15.8	197.3	4	65	181	2	183	11.8	0.1	11.9
	Venture Winds	Polenko	1/2	Tubular	24.4	33.5	18.0	254.0	6	100	12	0	12	1.2	0.0	1.2
	Venture Winds	Windmatic	1/2	Lattice	18.3	25.6	14.6	168.1	5	65	21	5	26	1.4	0.3	1.7
	Viking '83	Micon	1/2	Tubular	24.4	32.3	15.8	197.3	4	65	26	0	26	1.7	0.0	1.7
Altamont Power	Altamont Power	Danwin	1/2	–	–	–	–	–	–	110	0	25	25	0.0	2.8	2.8
	Altamont Power	Flowind	1/2	–	–	–	–	–	–	150	0	169	169	0.0	25.4	25.4
Altamont Winds	EIF Altamont	Kenetech 56-100	1/2	Lattice	18.3–42.7	27.7–52.1	18.0	254.0	5	100	89	11	100	8.9	1.1	10.0
	WEG	250 kW	1/2	–	–	–	–	–	–	250	20	0	20	5.0	0.0	5.0
	WPP 87	Kenetech 56-100	1/2	Lattice	18.3–42.7	27.7–52.1	18.0	254.0	5	100	411	89	500	41.1	8.9	50.0
	WPP 88	Kenetech 56-100	1/2	Lattice	18.3–42.7	27.7–52.1	18.0	254.0	5	100	270	30	300	27.0	3.0	30.0
enXco	Difwind 7	Bonus	1/2	Tubular	24.4	34.1	19.4	294.2	4	120	179	21	200	21.5	2.5	24.0
	Difwind 9	Bonus	1/2	Tubular	24.4	34.1	19.4	294.2	4	120	103	19	122	12.4	2.3	14.7
	Patterson Pass	Bonus	1/2	–	18.3	–	–	–	–	65	204	7	211	13.3	0.5	13.7
	Patterson Pass	Nordtank	1/2	Tubular	24.4	32.3	15.8	197.3	4	65	117	8	125	7.6	0.5	8.1
	WPP 89	Kenetech 56-100	1/2	Lattice	18.3–42.7	27.7–52.1	18.0	254.0	5	100	52	64	116	5.2	6.4	11.6
NextEra	GRP	Kenetech 56-100	1/2	Lattice	18.3–42.7	27.7–52.1	18.0	254.0	5	100	573	247	820	57.3	24.7	82.0
	GRP	KVS 33	1/2	–	24.4–36.6	40.9–53.1	33.0	855.3	–	400	21	0	21	8.4	0.0	8.4
	WPP 90	Kenetech 56-100	1/2	Lattice	18.3–42.7	27.7–52.1	18.0	254.0	5	100	79	61	140	7.9	6.1	14.0
	WPP 91	Kenetech 56-100	1/2	Lattice	18.3–42.7	27.7–52.1	18.0	254.0	5	100	126	37	163	12.6	3.7	16.3
	WPP 91-2	Kenetech 56-100	1/2	Lattice	18.3–42.7	27.7–52.1	18.0	254.0	5	100	142	80	222	14.2	8.0	22.2
	WPP 92	Kenetech 56-100	1/2	Lattice	18.3–42.7	27.7–52.1	18.0	254.0	5	100	182	106	288	18.2	10.6	28.8
	Diablo Winds	Vestas V-47	3	Tubular	41–65	64.5–88.0	46.9	1,730.5	4	660	31		31	20.5		20.5
Subtotal											*3,182*	*1,022*	*4,204*	*322.1*	*108.7*	*430.8*
Contra Costa County																
Pattern Energy	Tres Vaqueros	Howden	1/2	Tubular	25.0	39.9	31.1	759.1	4	330	79	7	86	26.1	2.3	28.4
	Tres Vaqueros	Howden	1/2	Tubular	34.1	49.0	45.4	1,619.9	5	750	1	0	1	0.8	0.0	0.8
enXco	Buena Vista	Danwin	1/2	–	–	–	–	–	–		0	14	14	0.0	0.0	0.0
	Buena Vista	Nordtank	1/2		24.4	32.3	15.8	197.3	4	65	0	60	60	0.0	3.9	3.9
	Buena Vista	Windmaster	1/2	–	–	–	–	–	–		0	101	101	0.0	0.0	0.0
	Difwind 9	Bonus	1/2	Tubular	24.4	45.7	23.2	421.5	–	150	3	0	3	0.5	0.0	0.5
	WPP 89	Kenetech 56-100	1/2	Lattice	18.3–42.7	27.7–52.1	18.0	254.0	5	100	0	1	1	0.0	0.1	0.1
NextEra	GRP	Kenetech 56-100	1/2	Lattice	18.3–42.7	27.7–52.1	18.0	254.0	5	100	0	671	671	0.0	67.1	67.1
	GRP	KVS 33	1/2	–	24.4–36.6	40.9–53.1	33.0	855.3	–	400	0	20	20	0.0	8.0	8.0
	WPP 90	Kenetech 56-100	1/2	Lattice	18.3–42.7	27.7–52.1	18.0	254.0	5	100	0	10	10	0.0	1.0	1.0
	WPP 91-2	Kenetech 56-100	1/2	Lattice	18.3–42.7	27.7–52.1	18.0	254.0	5	100	0	57	57	0.0	5.7	5.7
	WPP 92	Kenetech 56-100	1/2	Lattice	18.3–42.7	27.7–52.1	18.0	254.0	5	100	0	12	12	0.0	1.2	1.2
Wintec	Northwind	–	1/2	–	–	–	–	–	–		186	0	186	12.1	0.0	12.1
Intigen	Buena Vista	Mitsubishi 1000A	3	Tubular	60–68	89.5–97.5	61.4	2,959.4	2.5	1,000	38	0	38	38.0		38.0
Subtotal											*307*	*953*	*1,260*	*77.5*	*89.3*	*166.8*
AWPRA Total											3,489	1,975	5,464	399.6	198.0	597.6

Source: Avian Monitoring Team database. Last updated October 2011.
– = data not available.

Appendix B
NOP and Scoping Materials

ALAMEDA COUNTY COMMUNITY DEVELOPMENT AGENCY
PLANNING DEPARTMENT

Chris Bazar
Agency Director

Albert Lopez
Planning Director

224
West Winton Ave
Room 111

Hayward
California
94544

phone
510.670.5400
fax
510.785.8793

www.acgov.org/cda

FROM: Sandra Rivera
Assistant Planning Director
Alameda County Community Development Agency
224 W. Winton Avenue, Suite 110
Hayward, CA, 94544

SUBJECT: Notice of Preparation (Notice) of a Program Environmental Impact Report for the Altamont Pass Wind Resource Area (APWRA) revisions to Conditional Use Permits (CUPs) for repowering and continued maintenance and operation of wind turbines in Alameda County

SUMMARY:

The County of Alameda (County) is issuing this Notice to advise other agencies and the public that the County will be preparing a Program Environmental Impact Report (PEIR) for the Altamont Pass Wind Resource Area revised conditional use permits (CUPs)(proposed project) within the Alameda County portion of the APWRA in northern California. The County is proposing to issue revised CUPs to wind power companies that are currently operating wind turbines in the APWRA. The PEIR will be prepared in compliance with the California Environmental Quality Act (CEQA) and all relevant state and Federal laws. The County will serve as the lead agency under CEQA for preparation of the PEIR.

The County is issuing this Notice to alert interested parties and solicit public and agency input into the development of the scope of the PEIR and to advise the public that outreach activities conducted by the County and their representatives will be considered in the preparation of the PEIR.

Concurrent with preparation of this PEIR, the County is also preparing a Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP) and joint Program Environmental Impact Statement/Environmental Impact Report (PEIS/PEIR) under the National Environmental Policy Act (NEPA) and CEQA, respectively. The United States Fish and Wildlife Service (Service) will serve as the federal lead agency under NEPA. This Notice is being issued to comply with CEQA requirements for the revised CUPs only. An additional, but separate, scoping process is anticipated to be held in fall of 2010 by the County and the Service for the HCP/NCCP PEIS/PEIR.

DATES: Written comments on the scope of the Altamont Pass Wind Power Resources Area PEIR, including the project objectives, the alternatives to be considered, the impacts to be evaluated, and the methodologies to be used in the evaluations, should be provided to the County by October 8, 2010. A public scoping meeting is scheduled on September 2, 2010 at the time and location listed below.

ADDRESSES: Written comments on the project scope should be sent to Sandra Rivera, Assistant Planning Director, ATTN: Altamont Pass Wind Resource Area CUP PEIR, Alameda County Community Development Agency, 224 W. Winton Avenue, Suite 110, Hayward, CA, 94544, or via email with subject line "Altamont Pass Wind Resource Area CUP PEIR" to: APWRACUPEIR@acgov.org . Comments may also be provided orally or in writing at the scoping meeting scheduled at the following location:

City of Dublin Public Library:	Thursday, September 2, 2010 6:30 p.m. to 8:00 p.m. 200 Civic Plaza, Dublin, CA 94568

The project objectives, description of proposed repowering activities, revisions to the existing CUPs, and alternatives currently under consideration will be presented at this meeting. The meeting facilities will be accessible to persons with disabilities. If special translation or signing services or other special accommodations are needed, please contact Maria Palmeri, at 510.670.5400 or maria.palmeri@acgov.org at least 48 hours before the scoping meeting. Also scoping materials will be made available through the County's Internet site: www.acgov.org/cda/planning/landuseprojects/currentprojects/.

FOR FURTHER INFORMATION CONTACT: Sandra Rivera, Assistant Planning Director, ATTN: APWRA CUP PEIR, Alameda County Community Development Agency, 224 W. Winton Avenue, Suite 110, Hayward, CA, 94544, or at (510) 670-5400.

SUPPLEMENTARY INFORMATION:

Scoping

The County invites all interested individuals, organizations, public agencies, and Native American Tribes to comment on the scope of the PEIR, including the project's objectives, the alternatives to be studied, the impacts to be evaluated and the evaluation methods to be used. Comments should focus on alternatives that may be less costly or have fewer environmental or community impacts while achieving similar conservation and wind repowering objectives and the identification of any significant social, economic, or environmental issues related to alternatives.

The Proposed Project

The proposed project includes modification to existing CUPs for repowering of existing wind farms and the associated power operation and maintenance activities within the Alameda County portion of the APWRA. The County intends to modify its CUPs consistent with the conservation strategy in the HCP/NCCP. Updates to the CUP may include components unrelated to the conservation strategy that may have environmental impacts.

Upon completion of the APWRA HCP/NCCP, it is the intent of the County to amend the existing CUPs to include conservation actions related to repowering and long-term wind turbine operation and maintenance that will be defined in the HCP/NCCP. The amended CUPs will be applicable to all current and new wind farm projects in Alameda County so that any wind power company seeking local permits will be subject to the avoidance and minimization measures developed under those plans.

In addition to modification of the existing CUPs, two existing CUP permittees, Altamont Winds LLC and NextEra Energy Resources LLC, have proposed individual projects for inclusion in the proposed project. These individual projects, the 95MW Summit Wind project proposed by Altamont Winds and the NextEra Wind Repowering Project proposed by NextEra are described in detail below.

Summit Wind Project

Altamont Winds LLC (Altamont Winds), an existing CUP permittee, has proposed the 95 MW Summit Wind Project (Summit project) for inclusion in the PEIR and approval as part of the updated CUPs. The Summit project will be located within a 7,650-acre area of the larger APWRA south of Interstate 580 (I-580). Multiple wind farms of approximately 148 MW currently exist in the proposed Summit project area. These wind farms consist of approximately 1,394 wind turbines of varying types, generally sited in strings along ridgelines, on lattice and tubular towers 60 feet to 140 feet in height. The types of wind turbines vary from 100kW to 370kW capacities. Other equipment, facilities and infrastructure associated with these wind turbines include turbine foundations, access roads, electricity collection systems, communication lines for turbine control and monitoring systems, meteorological towers, maintenance housing facilities, and wind farm offices and control center (some of which are located offsite).

As proposed, the Summit project will replace existing, aging wind farm equipment with modern wind turbines and deliver wind generated electrical energy to the Pacific Gas & Electric Company (PG&E). The project is comprised of four components to be implemented sequentially as described below.

Decommissioning and Reclamation of Existing Wind Farms. Existing wind turbines, pad mount transformers and electrical cabinets, and meteorological towers will be permanently taken out of service, dismantled and physically removed. Power poles and electrical overhead power lines will be removed where they are no longer required. Concrete foundations for the turbine towers, pad mount transformers/electrical cabinets, and meteorological towers will be removed to a depth of three feet below ground level, or buried/covered with three feet of top soil, and contour graded to conform to natural surrounding ground levels. The restored ground surfaces will be re-seeded to match pre-project conditions. Most of the existing access roads will be removed except when need to serve remaining facilities (such as preserved electrical infrastructure) during future project operations.

New wind farm construction. The proposed Summit project would erect sixty (60) wind turbines rated at 1,600 kW each that consist of a 3-bladed rotor, 271 feet in diameter, coupled to a rotor hub and an enclosed electrical generator (with supporting controls), all mounted on a tubular steel tower approximately 262 feet in height. The actual individual turbine selected at the time of project installation may vary from the above description depending on available technology. Similar to the existing wind farm, the proposed turbines will be constructed with supporting infrastructure, a 21 kV or 34.5 kV electrical collection system between the turbines, and transmission line take-off (generally buried underground except where site conditions require overhead spans), turbine control and communications systems, other electrical/controls ancillary equipment, a substation for interconnection with the PG&E 115 kV transmission network, several permanent meteorological towers 262 feet in height, and one or more small equipment storage yards.

Operations and Maintenance. Following construction, the Summit project will be operated and maintained by PowerWorks LLC, an affiliate of Altamont Winds. PowerWorks operates and maintains over 900 wind turbines in the APWRA. Operations will be conducted using a remote control system that allows continuous monitoring and operation of the collective wind farm, as well as the individual wind turbines. Maintenance will involve both scheduled preventive and unscheduled repair work, both of which would utilize fully-equipped pickup trucks; however, on rare occasions, a crane may be needed to perform major unscheduled work. Operation and maintenance activities will function out of an existing facility, located within the APWRA, outside of, but near, the Summit project area.

Future Decommissioning and Reclamation. Altamont Winds intends to operate the proposed wind farm as long as it remains economically viable, but at least for 20 years, which is the typical life cycle for such facilities. When the proposed Summit project wind farm is no longer operable, it will be decommissioned and reclaimed using the same procedures as described above.

NextEra Wind Repowering Project

A second CUP permittee, NextEra Energy Resources, LLC, proposes to develop, construct, own and operate a 135.7 MW wind repowering project in the APWRA (NextEra project) under the updated CUP. The NextEra project site area is approximately 8,950 acres. The project boundary extends from the Contra Costa County and Alameda County boundary line on the north to various parcels south of the county line. It further extends to the south of I-580. Public roads will provide access to the NextEra project area, Altamont Pass Road, Flynn Road, Vasco Road, and Dyer Road. The NextEra project would be implemented with the same sequential components as described above for the Summit Wind project. Similar to the Summit Wind project, the NextEra project will remove existing turbines, and install up to fifty-nine (59) wind turbines, each of which would be approximately 428 feet in height to the tip of the blade and rated at 2.3 MW. Associated infrastructure would include reinforced concrete foundations for each wind turbine and their step-up transformers, local access roads, crane pads, a 34.5 kV electrical collection system, transmission line take-off, turbine control and communications systems, other electrical/controls ancillary equipment, substations for interconnections with the PG&E transmission network, and several permanent meteorological towers 262 feet in height. No new operations and maintenance facility construction would occur on the site. NextEra's existing facility located in Livermore would serve the project's operations and maintenance needs.

Construction of both the proposed Summit project and NextEra project are expected to occur in phases, with a typical duration of 8 to 12 months. The majority of construction activities will occur over a 4 month period during new wind turbine erection. It is anticipated that the Summit Wind project will begin interim construction periods as early as the fall of 2012, and continue periodically into 2018. The NextEra project's start date is not known at this time; however, all phases of construction are anticipated for completion no later than 2018.

Alternatives
The PEIR will consider the proposed project and a reasonable range of alternatives. Alternatives to the project will include a No Project scenario, and at least one alternative to the proposed project. This alternative may vary by the level of conservation, repowering activities, planning area, or some combination of these or other factors. The County welcomes comments from the public on the alternatives that should be considered.

To evaluate the potential environmental effects of the proposed project and its alternatives, the County intends to prepare a PEIR. Key issues that will be evaluated in the PEIR include:

- biological resources,
- land use planning and socioeconomics,
- aesthetics and visual resources,
- cultural resources,
- noise, and
- cumulative impacts.

Project Background
Wind turbines are currently operated under existing CUPs updated by the County in 2005. The majority of the permits were further amended in 2007 to incorporate requirements for Settling Party wind companies, which are discussed in more detail below. The following summarizes key dates, provisions, and decisions made that relate to the 2005 and 2007 CUP amendments.

- On November 13, 2003, and on January 29, 2004, the East County Board of Zoning Adjustments (EBZA) approved CUPs for the continued maintenance and operation of wind turbines in APWRA. The EBZA concluded that its decision to issue the CUPs was categorically exempt from CEQA. The Center for Biological Diversity (CBD), Californians for Renewable Energy (CARE), and Golden Gate Audubon Society (Audubon) appealed these approvals to the Alameda County Board of Supervisors.

- On September 22, 2005, the Alameda County Board of Supervisors upheld the decision of the EBZA to grant the CUPs with the inclusion of several conditions advocated by CBD, CARE and Audubon, including:
  1. An environmental impact report (EIR) is required that evaluates wind farm operation and a repowering program.
  2. Existing permits will expire in 13 years (2018).
  3. An APWRA Scientific Review Committee will be formed.
  4. An Avian Wildlife Protection Program & Schedule will be implemented, including seasonal shutdown and removal of high risk turbine requirements, and a schedule to remove turbines for repowering in increments of 10% by September 2009, 35% by 2013, 85% by 2015, and 100% by the end of the CUP term in 2018.

- Shortly thereafter, CARE and Audubon petitioned the Alameda County Superior Court for a writ of mandate to set aside the County's issuance of the CUPs on various grounds, including that the action violated the County's General Plan and CEQA.

- Extensive negotiations led in November 2006 to a Settlement Agreement among members of the Settling Parties. The Settlement Agreement had seven key provisions, summarized below.
  1. Wind companies will reduce avian raptor mortality by 50% by November 2009. This condition is applicable to four raptor species: golden eagle, burrowing owl, American kestrel, and red-tailed hawk.
  2. If the desired reduction is not achieved, an adaptive management program will be instituted and Alameda County will act on any needed permit modifications, provided the measures are consistent with the objectives of the Settlement Agreement.
  3. Higher risk turbines will be removed or relocated within 30 days of the Settlement Agreement.
  4. Additional high risk turbines will be removed or relocated by October 31, 2008.
  5. Shutdowns will be modified in the winter of 2007–2008 for data consistency.
  6. Companies may paint blades of up to 450 turbines as an experiment to reduce avian mortality.
  7. Parties will develop an NCCP applicable to activities of turbine owners and operators only. (Note: this effort was later expanded to include a HCP to cover species listed under the federal Endangered Species Act)

- On January 11, 2007, the County amended the CUPs of the Settling Party wind companies consistent with the terms of the Settlement Agreement. The amended CUPs were approved by the County concurrently with the County's approval of the Settlement Agreement. The approval of the amended CUPs allowed the wind power companies to continue producing wind energy while further reducing raptor mortality in the APWRA and meeting other provisions of the Settlement Agreement.

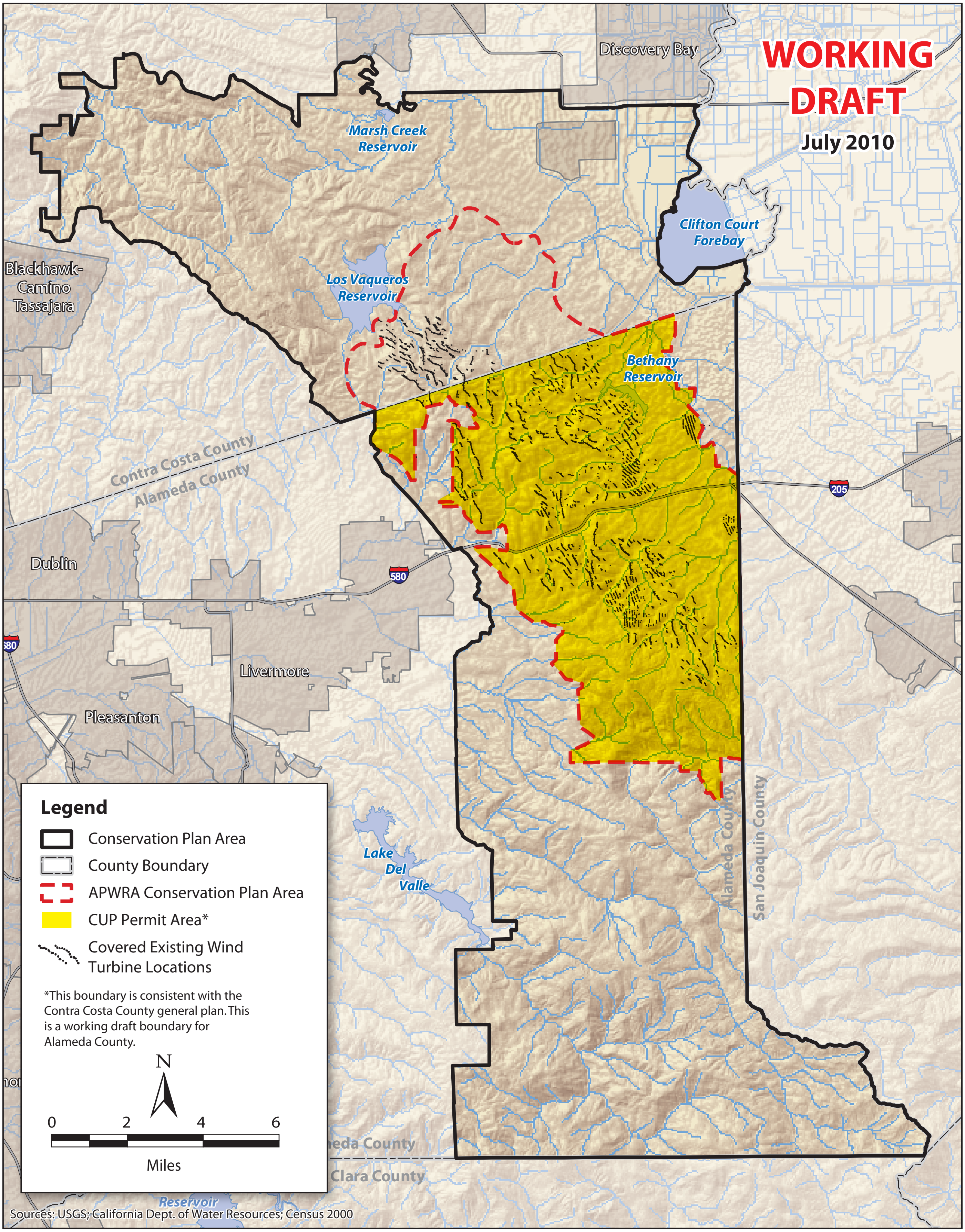
EIR Process and the Role of Participating Agencies and the Public

The County encourages broad participation in the EIR process during scoping and review of the resulting environmental documents. Comments and suggestions are invited from all interested agencies and the public at large so that the full range of issues related to the proposed project and all reasonable alternatives are addressed and that all significant issues are identified. In particular, the County is interested in learning whether there are areas of environmental concern where there might be a potential for significant impacts. For all potentially significant impacts, the PEIR will identify mitigation measures where feasible, to reduce these impacts to a level below significance.

Public agencies with jurisdiction are requested to advise the County of the applicable permit and environmental review requirements of each agency, and the scope and content of the environmental information that is germane to the agency's statutory responsibilities in connection with the proposed project. Public agencies are requested to advise the County if they anticipate taking a major action in connection with the proposed project and if they wish to cooperate in the preparation of the PEIR.

A public scoping meeting has been scheduled as an important component of the scoping process for compliance with state environmental law. Details of the scoping meeting described in this Notice will be advertised in local newspapers and on the County's internet site: www.acgov.org/cda/planning/landuseprojects/currentprojects.

Due to the time limits mandated by state law, public agencies are requested to send their responses to this Notice to the County at the address provided above at the earliest possible date but not later than 45 days after receipt of this Notice. Members of the general public should provide scoping comments by October 8, 2010.



Graphics ... 00323.08 (08/10) AB

ICF INTERNATIONAL

APWRA Conservation Plan Area and CUP Permit Area

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit

Arnold Schwarzenegger
Governor

Cathleen Cox
Acting Director

Notice of Preparation

August 24, 2010

To: Reviewing Agencies

Re: Altamont Pass Wind Resource Area Revised Conditional Use Permits
SCH# 2010082063

Attached for your review and comment is the Notice of Preparation (NOP) for the Altamont Pass Wind Resource Area Revised Conditional Use Permits draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Sandra Rivera
Alameda County Community Development Agency-Planning
224 W. Winton Avenue, Room 111
Hayward, CA 94544

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

Document Details Report
State Clearinghouse Data Base

SCH# 2010082063
Project Title Altamont Pass Wind Resource Area Revised Conditional Use Permits
Lead Agency Alameda County

Type NOP Notice of Preparation

Description Modification to existing CUPs for repowering (replacement of towers and turbines) of existing wind farms and associated power operation and maintenance activities within the Alameda County portion of the Altamont Pass Wind Resource Area. The modified CUPs will be consistent with a concurrent program for a Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP). Updates to the CUPs may include components unrelated to the HCP/NCCP that may have environmental impacts. Two individual repowering projects will also be included as part of the program, the 95 MW Summit Wind project proposed by Altamont Winds, Inc., and the 135.7 MW project proposed by NextEra Energry Resources, LLC.

Lead Agency Contact

Name Sandra Rivera
Agency Alameda County Community Development Agency-Planning
Phone 510-670-5400 ***Fax***
email
Address 224 W. Winton Avenue, Room 111
City Hayward ***State*** CA ***Zip*** 94544

Project Location

County Alameda
City Livermore, Tracy, Unincorporated
Region
Cross Streets
Lat / Long
Parcel No.
Township ***Range*** ***Section*** ***Base***

Proximity to:

Highways I-580
Airports Livermore City
Railways
Waterways
Schools
Land Use Large Parcel Agriculture

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Biological Resources; Cumulative Effects; Vegetation; Wetland/Riparian

Reviewing Agencies Resources Agency; Department of Conservation; California Energy Commission; Office of Historic Preservation; Department of Parks and Recreation; Department of Water Resources; Department of Fish and Game, Region 3; Native American Heritage Commission; Public Utilities Commission; State Lands Commission; Caltrans, Division of Aeronautics; Caltrans, District 4; Department of Toxic Substances Control; Regional Water Quality Control Board, Region 2

Date Received 08/24/2010 ***Start of Review*** 08/24/2010 ***End of Review*** 09/22/2010

Note: Blanks in data fields result from insufficient information provided by lead agency.

NOP Distribution List

CAG

County: Alameda

SCH# 2010082063

Resources Agency

- ■ **Resources Agency** Nadell Gayou
- ☐ **Dept. of Boating & Waterways** Mike Sotelo
- ☐ **California Coastal Commission** Elizabeth A. Fuchs
- ☐ **Colorado River Board** Gerald R. Zimmerman
- ■ **Dept. of Conservation** Rebecca Salazar
- ■ **California Energy Commission** Eric Knight
- ☐ **Cal Fire** Allen Robertson
- ☐ **Central Valley Flood Protection Board** James Herota
- ■ **Office of Historic Preservation** Ron Parsons
- ■ **Dept of Parks & Recreation** Environmental Stewardship Section
- ☐ **California Department of Resources, Recycling & Recovery** Sue O'Leary
- ☐ **S.F. Bay Conservation & Dev't. Comm.** Steve McAdam
- ■ **Dept. of Water Resources** Resources Agency Nadell Gayou
- ☐ ______ Conservancy

Fish and Game

- ☐ **Depart. of Fish & Game** Scott Flint Environmental Services Division
- ☐ **Fish & Game Region 1** Donald Koch
- ☐ **Fish & Game Region 1E** Laurie Harnsberger
- ☐ **Fish & Game Region 2** Jeff Drongesen
- ■ **Fish & Game Region 3** Charles Armor
- ☐ **Fish & Game Region 4** Julie Vance
- ☐ **Fish & Game Region 5** Don Chadwick Habitat Conservation Program
- ☐ **Fish & Game Region 6** Gabrina Gatchel Habitat Conservation Program
- ☐ **Fish & Game Region 6 I/M** Brad Henderson Inyo/Mono, Habitat Conservation Program
- ☐ **Dept. of Fish & Game M** George Isaac Marine Region

Other Departments

- ☐ **Food & Agriculture** Steve Shaffer Dept. of Food and Agriculture
- ☐ **Depart. of General Services** Public School Construction
- ☐ **Dept. of General Services** Anna Garbeff Environmental Services Section
- ☐ **Dept. of Public Health** Bridgette Binning Dept. of Health/Drinking Water

Independent Commissions, Boards

- ☐ **Delta Protection Commission** Linda Flack
- ☐ **Cal EMA (Emergency Management Agency)** Dennis Castrillo
- ☐ **Governor's Office of Planning & Research** State Clearinghouse
- ■ **Native American Heritage Comm.** Debbie Treadway
- ■ **Public Utilities Commission** Leo Wong
- ☐ **Santa Monica Bay Restoration** Guangyu Wang
- ■ **State Lands Commission** Marina Brand
- ☐ **Tahoe Regional Planning Agency (TRPA)** Cherry Jacques

Business, Trans & Housing

- ■ **Caltrans - Division of Aeronautics** Sandy Hesnard
- ☐ **Caltrans - Planning** Terri Pencovic
- ☐ **California Highway Patrol** Scott Loetscher Office of Special Projects
- ☐ **Housing & Community Development** CEQA Coordinator Housing Policy Division

Dept. of Transportation

- ☐ **Caltrans, District 1** Rex Jackman
- ☐ **Caltrans, District 2** Marcelino Gonzalez
- ☐ **Caltrans, District 3** Bruce de Terra
- ■ **Caltrans, District 4** Lisa Carboni
- ☐ **Caltrans, District 5** David Murray
- ☐ **Caltrans, District 6** Michael Navarro
- ☐ **Caltrans, District 7** Elmer Alvarez
- ☐ **Caltrans, District 8** Dan Kopulsky
- ☐ **Caltrans, District 9** Gayle Rosander
- ☐ **Caltrans, District 10** Tom Dumas
- ☐ **Caltrans, District 11** Jacob Armstrong
- ☐ **Caltrans, District 12** Chris Herre

Cal EPA

Air Resources Board

- ☐ Airport Projects Jim Lerner
  - ☐ Transportation Projects Douglas Ito
  - ☐ Industrial Projects Mike Tollstrup
- ☐ **State Water Resources Control Board** Regional Programs Unit Division of Financial Assistance
- ☐ **State Water Resources Control Board** Student Intern, 401 Water Quality Certification Unit Division of Water Quality
- ☐ **State Water Resouces Control Board** Steven Herrera Division of Water Rights
- ■ **Dept. of Toxic Substances Control** CEQA Tracking Center
- ☐ **Department of Pesticide Regulation** CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

- ☐ **RWQCB 1** Cathleen Hudson North Coast Region (1)
- ■ **RWQCB 2** Environmental Document Coordinator San Francisco Bay Region (2)
- ☐ **RWQCB 3** Central Coast Region (3)
- ☐ **RWQCB 4** Teresa Rodgers Los Angeles Region (4)
- ☐ **RWQCB 5S** Central Valley Region (5)
  - ☐ **RWQCB 5F** Central Valley Region (5) Fresno Branch Office
  - ☐ **RWQCB 5R** Central Valley Region (5) Redding Branch Office
- ☐ **RWQCB 6** Lahontan Region (6)
  - ☐ **RWQCB 6V** Lahontan Region (6) Victorville Branch Office
- ☐ **RWQCB 7** Colorado River Basin Region (7)
- ☐ **RWQCB 8** Santa Ana Region (8)
- ☐ **RWQCB 9** San Diego Region (9)
- ☐ **Other** ______

Last Updated on 07/12/10

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH# 2010082063

Project Title: Altamont Pass Wind Resource Area Revised Conditional Use Permits Notice of Preparation

Lead Agency: Alameda County Community Development Agency - Planning Contact Person: Sandra Rivera
Mailing Address: 224 W. Winton Ave, Rm 111 Phone: 510.670.5400
City: Hayward Zip: 94544 County: Alameda County

Project Location: County: unincorporated Alameda County City/Nearest Community: cities of Livermore and Tracy
Cross Streets: ______ Zip Code: ______
Longitude/Latitude (degrees, minutes and seconds): ___° ___′ ___″ N / ___° ___′ ___″ W Total Acres: ______
Assessor's Parcel No.: ______ Section: ______ Twp.: ______ Range: ______ Base: ______
Within 2 Miles: State Hwy #: I-580 Waterways: ______
Airports: City of Livermore Airport Railways: ______ Schools: ______

Document Type:

CEQA: ☑ NOP ☐ Draft EIR ☐ Early Cons ☐ Supplement/Subsequent EIR ☐ Neg Dec (Prior SCH No.) ______ ☐ Mit Neg Dec Other: ______
NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI
Other: ☐ Joint Document ☐ Final Document ☐ Other: ______

RECEIVED
AUG 23 2010
STATE CLEARING HOUSE

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☑ Use Permit ☐ Land Division (Subdivision, etc.)
☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☐ Other: ______

Development Type:

☐ Residential: Units ______ Acres ______
☐ Office: Sq.ft. ______ Acres ______ Employees ______
☐ Commercial: Sq.ft. ______ Acres ______ Employees ______
☐ Industrial: Sq.ft. ______ Acres ______ Employees ______
☐ Educational: ______
☐ Recreational: ______
☐ Water Facilities: Type ______ MGD ______
☐ Transportation: Type ______
☐ Mining: Mineral ______
☑ Power: Type Wind Turbine MW 230.7 (initial)
☐ Waste Treatment: Type ______ MGD ______
☐ Hazardous Waste: Type ______
☐ Other: ______

Project Issues Discussed in Document:

☑ Aesthetic/Visual ☑ Agricultural Land ☑ Air Quality ☐ Archeological/Historical ☑ Biological Resources ☐ Coastal Zone ☐ Drainage/Absorption ☐ Economic/Jobs
☐ Fiscal ☐ Flood Plain/Flooding ☐ Forest Land/Fire Hazard ☐ Geologic/Seismic ☐ Minerals ☐ Noise ☐ Population/Housing Balance ☐ Public Services/Facilities
☐ Recreation/Parks ☐ Schools/Universities ☐ Septic Systems ☐ Sewer Capacity ☐ Soil Erosion/Compaction/Grading ☐ Solid Waste ☐ Toxic/Hazardous ☐ Traffic/Circulation
☑ Vegetation ☐ Water Quality ☐ Water Supply/Groundwater ☑ Wetland/Riparian ☐ Growth Inducement ☐ Land Use ☑ Cumulative Effects ☐ Other: ______

Present Land Use/Zoning/General Plan Designation:
Large Parcel Agriculture

Project Description: *(please use a separate page if necessary)*
Modification to existing CUPs for repowering (replacement of towers and turbines) of existing wind farms and associated power operation and maintenance activities within the Alameda County portion of the Altamont Pass Wind Resource Area. The modified CUPs will be consistent with a concurrent program for a Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP). Updates to the CUPs may include components unrelated to the HCP/NCCP that may have environmental impacts. Two individual repowering projects will also be included as part of the program, the 95 MW Summit Wind project proposed by Altamont Winds, Inc., and the 135.7 MW project proposed by NextEra Energy Resources, LLC. A more detailed project description is provided in the attached Notice of Completion.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

____	Air Resources Board	____	Office of Emergency Services
____	Boating & Waterways, Department of	____	Office of Historic Preservation
____	California Highway Patrol	____	Office of Public School Construction
____	Caltrans District # ____	____	Parks & Recreation, Department of
____	Caltrans Division of Aeronautics	____	Pesticide Regulation, Department of
____	Caltrans Planning	S	Public Utilities Commission
____	Central Valley Flood Protection Board	____	Regional WQCB # ____
____	Coachella Valley Mtns. Conservancy	____	Resources Agency
____	Coastal Commission	____	S.F. Bay Conservation & Development Comm.
____	Colorado River Board	____	San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
____	Conservation, Department of	____	San Joaquin River Conservancy
____	Corrections, Department of	____	Santa Monica Mtns. Conservancy
____	Delta Protection Commission	____	State Lands Commission
____	Education, Department of	____	SWRCB: Clean Water Grants
____	Energy Commission	____	SWRCB: Water Quality
S	Fish & Game Region # 3	____	SWRCB: Water Rights
____	Food & Agriculture, Department of	____	Tahoe Regional Planning Agency
____	Forestry and Fire Protection, Department of	____	Toxic Substances Control, Department of
____	General Services, Department of	____	Water Resources, Department of
____	Health Services, Department of		
____	Housing & Community Development	____	Other: ____
____	Integrated Waste Management Board	____	Other: ____
____	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date August 23, 2010 Ending Date October 8, 2010

Lead Agency (Complete if applicable):

Consulting Firm: ICF International
Address: 268 Grand Ave.
City/State/Zip: Oakland, CA 94610-4724
Contact: Seema SAIRAM
Phone: 510-433-8962 ((415) 677-7148)

Applicant: 1) Altamont Winds, Inc.; 2) NextEra En. Res. LLC
Address: 1) 15850P Jess Ranch Rd.; 2) 6185 Industrial Way
City/State/Zip: 1) Tracy, CA 95377; 2) Livermore, CA 94551
Phone: 1) 925-724-0175; 2) 925-245-9411

Signature of Lead Agency Representative: [signature] **Date:** 8/23/10

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

Revised 2008

DEPARTMENT OF TRANSPORTATION
DIVISION OF AERONAUTICS – M.S.#40
1120 N STREET
P. O. BOX 942874
SACRAMENTO, CA 94274-0001
PHONE (916) 654-4959
FAX (916) 653-9531
TTY 711

Flex your power!
Be energy efficient!

NOP
Clear
09/22/10
l.

RECEIVED
SEP 07 2010
STATE CLEARING HOUSE

September 1, 2010

Ms. Sandra Rivera
Alameda County Community Development Agency-Planning
224 W. Winton Avenue, Room 111
Hayward, CA 94544

Dear Ms. Rivera:

Re: Alameda County's Notice of Preparation of a Draft Environmental Impact Report for the Altamont Pass Wind Resources Area Revised Conditional Use Permit; SCH# 2010082063

The California Department of Transportation (Caltrans) Division of Aeronautics reviewed the above-referenced document with respect to airport-related noise and safety impacts and regional aviation land use planning issues pursuant to the California Environmental Quality Act (CEQA).

The proposal is for the modification of the existing Conditional Use Permits in order to repower (replacement of) existing towers and turbines on wind farms including two individual repowering projects, the 95 MW Summit Wind project proposed by Altamont Winds, Inc, and the 135.7 MW proposal by NextEra Energy Resources, LLC. We noted that the new turbines and towers will exceed the heights of existing turbines and towers.

California Public Utilities Code Section 21659 prohibits structural hazards near airports. For all of the proposed structures that will exceed 200 feet in height, a Notice of Proposed Construction or Alteration (Form 7460-1) will be required by the Federal Aviation Administration (FAA) in accordance with Federal Aviation Regulation, Part 77 "Objects Affecting Navigable Airspace." Form 7460-1 is available on-line at https://oeaaa.faa.gov/oeaaa/external/portal.jsp and should be submitted electronically to the FAA.

These comments reflect the areas of concern to the Division of Aeronautics with respect to airport-related noise, safety, and regional land use planning issues. We advise you to contact our District 4 office concerning surface transportation issues.

Thank you for the opportunity to review and comment on this proposal. If you have any questions, please call me at (916) 654-5314 or by email at sandy.hesnard@dot.ca.gov.

Sincerely,

Original Signed by

SANDY HESNARD
Aviation Environmental Specialist

c: State Clearinghouse, Alameda County ALUC

State of California – The Natural Resources Agency
DEPARTMENT OF FISH AND GAME
Bay Delta Region
7329 Silverado Trail
Napa, CA 94558
(707) 944-5500
www.dfg.ca.gov

***ARNOLD SCHWARZENEGGER**, Governor*
***John McCamman**, Director*

RECEIVED
OCT 12 2010
STATE CLEARING HOUSE

NOP
Clear
09/22/10
Late
R.

October 6, 2010

Ms. Sandra Rivera
Assistant Planning Director
Alameda County Community Development Agency
224 West Winton Avenue, Suite 110
Hayward, CA 94544

Dear Ms. Rivera:

Subject: Altamont Pass Wind Resource Area Conditional Use Permits, Programmatic Environmental Impact Report, SCH #2010082063, Alameda County

The Department of Fish and Game (Department) appreciates the opportunity to comment on the Notice of Preparation (NOP) of a Programmatic Environmental Impact Report (PEIR) for the Altamont Pass Wind Resource Area (APWRA) revisions to Conditional Use Permits (CUPs). Although the current CUPs will expire in 2018, preparation of the PEIR is obligated by the 2007 Settlement Agreement (Settlement Agreement) between Audubon, the wind companies, and the County of Alameda. The proposed project is intended to modify the existing CUPs to include conservation actions that are to be developed as part of the APWRA Habitat Conservation Plan/Natural Community Conservation Plan (APWRA Plan). Development of the APWRA Plan, or a similar agreement, is also obligated by the 2007 Settlement Agreement. However, if the APWRA Plan or a similar agreement is not agreed to, the PEIR may be used to modify the CUPs to be consistent with the Settlement Agreement.

In addition to the modifications of the existing CUPs, Altamont Winds LLC and NextEra Energy Resources LLC have proposed wind turbine repower projects to be included as part of the PEIR. Altamont Winds LLC has proposed the Summit Wind Project, consisting of approximately sixty 1.6-mega watt (MW) wind turbines on 7,650 acres, in the APWRA south of Interstate 580. Next Era Energy Resources LLC has proposed the NextEra Project, consisting of approximately fifty-nine 2.3 MW wind turbines on 8,900 acres, in the APWRA north and south of Interstate 580. These two projects combined would have an estimated installed capacity of 230.7 MW.

The PEIR NOP states that it is the intent of the County of Alameda to modify its CUPs consistent with the conservation strategy that is being developed as part of the APWRA Plan. The two repower projects included as part of the PEIR have a combined installed capacity that is nearly half of the 416 MW cap currently in place in the Alameda County portion of the APRWA. Under the draft Planning Agreement for the APRWRA Plan, these two projects are to be treated as interim projects.

Conserving California's Wildlife Since 1870

The Department is concerned that consideration of two significant repower projects in the early stages of the APWRA Plan development may exclude viable conservation strategies and opportunities, and as a result dictate the types of conservation strategies available to the APWRA Plan. The conservation strategies developed during the APWRA Plan process are designed to guide those aspects of project design that may, or are known to, impact biological resources. Consistent with Fish and Game Code Section 2800 et seq, known as the Natural Community Conservation Planning Act, the Department may provide recommended mitigation measures or project alternatives as part of the interim project process that would help achieve the preliminary conservation objectives. In addition to considering recommendations made during the interim project process, the Department suggests the PEIR describe how these two projects will remain responsive to viable conservation strategies and not preclude or limit their development.

Ongoing or recurring biological impacts associated with the operation of current and proposed wind turbine generators (WTGs) should be analyzed. The analysis needs to include both bat and avian species that may be affected. Current methodologies base impacts and mitigation on four focal raptor species, the Golden eagle, Red-tailed hawk, American kestrel, and Burrowing owl. While these species have been used for assessing impacts on older generation WTGs, changes in design of newer WTGs may result in effects on a different suite of species. It is important that impacts to all avian and bat species be evaluated when analyzing impacts. Additionally, impacts to biological resources associated with construction of new WTGs and the remediation of old WTGs should be analyzed.

Careful siting of turbines appears to be one of the most effective ways to reduce impacts to biological resources. Based upon consultation with the Altamont Scientific Review Committee, the Department, the U.S. Fish and Wildlife Service, and the best available scientific information, the PEIR should describe high risk placements of WTGs and prohibit them.

While careful siting of turbines can help minimize anticipated levels of mortality, unknown factors may result in particular turbines being especially high risk to avian and bat species. An adaptive management and monitoring plan should be developed to assess both high risk turbines and additional methods of minimizing bird and bats mortalities. To be effective, the adaptive management and monitoring plan must have actionable items that can reasonably be expected to result in a change in mortality. The determination of thresholds to trigger management actions should not be limited to the four focal raptor species or be based solely on averages among species, as this can obscure potentially significant effects at the species level.

On January 11, 2007 the Board of Supervisors of the County of Alameda adopted Resolution R-2007-111, amending 29 CUPs and approving two additional CUPs, so as to be consistent with the terms of the Settlement Agreement. The Department would like to call attention to, and comment upon, the items identified in Condition 8 of Resolution R-2007-111, as this condition identifies content to be contained in the PEIR. In italics below are excerpts from Condition 8, followed by the Department's comment:

- *The* [P]*EIR will assess the environmental impacts of the repowering program (including both specific proposals and the overall repowering program set forth herein), the continued operation of existing turbine facilities, and the effectiveness of the various strategies to reduce and minimize avian mortality and other adverse impacts on wildlife (such as new turbine technology, site-specific measures, grazing management, etc.).*

  When assessing the environmental impacts, the Department recommends avoidance as the primary method of reducing impacts to biological resources. When this is no longer possible, a project should then explore the most effective methods to minimize impacts. Once avoidance and minimization measures have been exhausted the remaining impacts should be sufficiently mitigated. Additionally, mitigation for significant impacts identified in the PEIR should be mitigated consistent with the draft East Alameda County Conservation Strategy that was developed by local agencies, including Alameda County, and is supported by the Department.

- *The* [P]*EIR will seek to verify and validate current assumptions regarding the benefit of repowering as a means of substantially and significantly reducing the amount of avian injury and mortality resulting from most existing types of turbines, and identify appropriate means of ensuring that repowered turbines have the lowest possible rate of avian mortality.*

  The assumption regarding new technology WTGs one MW and above is that larger turbines will result in fewer mortalities. This assumption needs to be validated with peer reviewed scientific research conducted on WTGs that are similar in rotor diameter and height in order to assess future impacts from repowering.

- *The [P]EIR shall also study siting in the Altamont as a whole, and may also address how to provide incentives for an increased rate of repowering, including expanding areas where wind power facilities may be permitted.*

  Incentives for an increase rate of repowering should only be developed if it is shown that new generation WTGs reduce avian and bat fatality and mitigation measures can substantially reduce or compensate for mortalities. A proposed expansion of areas permitted for WTGs should not be contemplated until the ability to mitigate impacts from ongoing and proposed repower projects is assessed and realized. This assessment is beyond the scope of the PEIR and, as such, any expansion of WTGs should not be included.

The Department, as the Trustee Agency for fish and wildlife pursuant to the California Environmental Quality Act Section 15386, is responsible for the conservation, protection, and management of the State's biological resources. The Department acts as a Responsible Agency when a subsequent permit or other type of discretionary approval is required from the Department, such as an Incidental Take Permit (ITP), pursuant to the California Endangered Species Act, or a Lake and Streambed Alteration Agreement

(LSAA), issued under Fish and Game Code Section 1600 et seq. Based on the information we have been provided to date, activities identified in the PEIR NOP will likely require an ITP and LSAA.

The Department supports the development of renewable energy resources for projects which are in compliance with existing state and federal laws; include measures that when implemented effectively avoid and minimize impacts to native species and their habitats; include sufficient mitigation for unavoidable impacts; and provide for the conservation of biological resources. As both a Responsible Agency and Trustee Agency, the Department requests the opportunity to cooperate in the preparation of the PEIR in order to continue our close coordination with activities undertaken as part of the APWRA Plan.

If you have any questions, please contact Mr. Craig Weightman, Staff Environmental Scientist, at (707) 944-5577 or cweightman@dfg.ca.gov; or Mr. Scott Wilson, Environmental Program Manager, at (707) 944-5584.

Sincerely,

Charles Armor
Regional Manager
Bay Delta Region

cc: State Clearinghouse

Mr. Mike Thomas
U.S. Fish and Wildlife Service
2800 Cottage Way, W-2605
Sacramento, CA 95825

CENTER for BIOLOGICAL DIVERSITY Because life is good.

October 8, 2010

Sent via electronic mail on October 8, 2010 to APWRACUPEIR@acgov.org

Sandra Rivera
Assistant Planning Director
Alameda County Community Development Agency
224 W. Winton Avenue, Suite 110
Hayward, CA, 94544

Thank you for the opportunity to comment on the Notice of Preparation of a Program Environmental Impact Report for the Altamont Pass Wind Resource Area (APWRA) revisions to Conditional Use Permits (CUPs) for repowering and continued maintenance and operation of wind turbines in Alameda County. The Center for Biological Diversity is a national non-profit conservation organization dedicated to the protection of endangered species and wild places.

Background

The Center has been involved since 2003 in efforts to reduce avian mortality at the APWRA; we have filed previous appeals on CUPs for APWRA, filed a lawsuit against energy companies for violations of state and federal wildlife laws, and participated in the County's review and revision of permit conditions from 2004 to 2007. The Center was not a party to the ill-advised settlement agreement in 2007 that revised and relaxed CUP permit conditions.

As a conservation organization involved with efforts to reduce greenhouse gas emissions, we believe that using alternative energy sources like clean wind energy is essential to reducing our impact on the environment. However, it is undisputed that the poorly sited wind turbines at APWRA continue to kill thousands of birds each year, including more than a thousand birds of prey from 40 different species, through collisions with turbines and electrocution on power lines. Located on a major bird migratory route in an area with large concentrations of raptors — including the highest density of breeding golden eagles in the world — APWRA is the most lethal wind farm in North America for birds of prey, causing massive ongoing kills of hawks, burrowing owls, falcons, golden eagles, and other raptor species. The original permits for the thousands of wind turbines at APWRA were issued without conducting an environmental impact report, contrary to requirements under the California Environmental Quality Act (CEQA). Some Altamont energy companies continue to use antiquated turbines that are poorly placed, inefficient, and a high risk to birds. According to wind-industry reports, the controversy over bird kills at Altamont Pass has hampered wind power development in other area as unresolved concerns about impacts to birds cause other wind facilities' construction to be delayed or operations to be discontinued. The ongoing bird kills at APWRA are in violation of California

351 California St., Ste. 600 . San Francisco, CA 94104 tel: (415) 436.9682 fax: (415) 436.9683 www.BiologicalDiversity.org

and federal wildlife laws, including criminal provisions of those laws. These violations include California Fish and Game Code sections 2000, 3503.5, 3511, 3513, 3800, 12000, California Code of Regulations sections 472, 509; title 16 United States Code section 668 (the Bald Eagle and Golden Eagle Protection Act); title 16 United States Code section 703 (the Migratory Bird Treaty Act); and title 50 Code of Federal Regulations sections 10.13, 21.11, 22.11.

Wind energy can be produced without decimating wildlife populations, by reviewing siting of wind farms for bird abundance, migration, and use patterns, and designing and operating wind farms to prevent or minimize bird mortality. Existing wind facilities with adverse impacts on birds, such as the APWRA, should be required to reduce bird kills as much as possible, and mitigate fully by providing adequate compensation for any continuing impacts.

Recommendations made by the California Energy Commission to replace obsolete turbines with fewer, more efficient turbines, implement mitigation measures to reduce bird kills at existing turbines, and preserve off-site nesting habitat for raptors to compensate for ongoing unacceptable bird losses should be adopted at APWRA.

Failure to Implement Permit Conditions and Mitigation Measures

In January 2007 Alameda County reached a settlement agreement with Audubon regarding reduction of bird kills at APWRA that resulted in new permit conditions and mitigation measures. This controversial agreement scuttled existing permit conditions adopted by the Alameda County Board of Supervisors in September 2005 that conservation groups had worked three years to negotiate and implement. The key promise of the 2007 settlement agreement was a 50% reduction in kills of four focal raptor species within three years. Continued energy company violations of the settlement agreement and permit conditions have been documented since 2007, and Alameda County has attempted to subvert bird fatality reduction measures (Smallwood 2008). Mitigation recommendations made so the County's Scientific Review Committee have been grossly inadequate or have been ignored by the Altamont energy companies. Some simple mitigation recommendations made by the SRC have not been implemented, such as removing derelict towers, moving rock piles to manage rodent prey away from turbines, and removing the most lethal turbines. As the energy companies continue to miss deadlines for required mitigation measures, Alameda County simply revises the deadlines. Credible compliance monitoring with promised mitigation measures is non-existent because the County simply relies on industry reports of compliance. The energy companies have repeatedly refused to give requested data to the SRC.

Energy companies without approved repowering plans or verified compliance with SRC recommended mitigation measures should not be issued CUP permits.

Increased Raptor Mortality

The energy companies have not achieved the promised 50% reduction in raptor mortality over the three-year monitoring period. In fact, while Alameda County refuses to enforce permit conditions and promised mitigations, and energy companies refuse to implement them, raptor mortality at APWRA appears to have increased significantly recently. Bird fatality rates at APWRA appear to have increased 85% for all raptors and 51% for all birds between the periods 1998–2003 and 2005–2007 (Smallwood and Karas 2009). A monitoring report by a consultant for the energy companies (WEST et al. 2007) documented more dead raptors collected at Altamont Pass over 1.5 years than were found by California Energy Commission researchers over 4.5 years from 1998-2003 (Smallwood and Thelander 2004), when annual raptor mortality was estimated at an alarming 881 to 1,300 birds of prey. Recent reports (e.g. Smallwood et al. 2006, 2007) that wind turbines at Altamont Pass likely kill over 100 burrowing owls annually, a significant number of the burrowing owls nesting at Altamont, making the wind farm a population sink for this imperiled species.

Scope of EIR and Proposed NCCP/HCP

The NOP states that: "Concurrent with preparation of this PEIR, the County is also preparing a Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP) and joint Program Environmental Impact Statement/Environmental Impact Report (PEIS/PEIR) under the National Environmental Policy Act (NEPA) and CEQA, respectively. The United States Fish and Wildlife Service (Service) will serve as the federal lead agency under NEPA. This Notice is being issued to comply with CEQA requirements for the revised CUPs only. An additional, but separate, scoping process is anticipated to be held in fall of 2010 by the County and the Service for the HCP/NCCP PEIS/PEIR."

The PEIR is for issuance of revised CUPs for the continued operation and repowering of wind turbines at APWRA. The NOP states that another CEQA and NEPA review will occur for a planned NCCP/HCP, which apparently would revise the CUPs again, making the current EIR/EIS obsolete. How can the EIR reach significance conclusions pursuant to CEQA prior to completion of the HCP/NCCP? Is the current EIR/EIS assuming that the HCP/NCCP avoidance and minimization measures will reduce impacts to a level of less than significant? The description appears to imply that the HCP/NCCP avoidance and minimization measures will be the primary method of mitigating impacts for existing projects. Given the history of ineffective mitigation agreements in the APWRA and Alameda County's failure to enforce them or relaxing permit conditions based on false claims of compliance with CUPs (Smallwood 2008), the failure to achieve any reduction of avian fatality rates at APWRA over two decades of agreements and mitigation plans, the disturbing magnitude of the ongoing environmental impacts, and the limited suite of mitigation options the County is willing to consider, no further consideration should be given to another EIR/EIS for a NCCP/HCP.

The NOP gives the misleading impression that a mitigation strategy prepared for the NCCP/HCP would be superior to the strategy in the PEIR. The available suite of mitigation measures have been reviewed by the SRC for four years. Three of the five SRC members have been involved with fatality monitoring and research in the APWRA for periods spanning 11 to 21 years. It is highly unlikely that the committee convened to guide the NCCP/HCP -- composed mostly of individuals with little if any experience in the APWRA -- will develop a mitigation strategy that is more effective than a strategy developed by the SRC.

It is unclear whether the current EIR/EIS will analyze biological effects cumulatively or on a project by project basis. Analyzing impacts cumulatively will potentially deemphasize the effects of the existing projects due to potential benefits derived from repowering. Furthermore, combining the existing CUPs and the two repowering projects into a single ‘project’ for purposes of CEQA is inappropriate. There should be separate EIRs for existing CUPs and repowering, with the EIR for existing CUPs analyzing operations of existing windfarms, and the repowering EIR analyzing removal of existing windfarms and siting and impacts of new windfarms.

Project Alternatives

The EIR/EIS should also include evaluation of alternatives that a) require complete repowering of APWRA to modern wind turbines with careful siting to minimize environmental impacts; and b) close the APWRA and remove all wind turbines.

Repowering

Repowered turbines should be sited according to guidelines and criteria to minimize collision hazards to birds and bats, and to minimize grading impacts by construction of access roads and turbine laydown areas. Siting should be guided by patterns of fatality rates among APWRA wind turbines, flight patterns of species of greatest concern (golden eagle, red-tailed hawk, American kestrel, burrowing owl), and the spatial distribution of burrowing owl burrows. Siting methods have been developed by Smallwood and Neher (2009), Smallwood et al. (2009), and Smallwood and Neher (2010). Post-construction fatality and utilization monitoring should be required for at least five years, so that the effects of repowering on fatality rates and habitat displacement (avoidance effects) can be quantified to inform future permit renewals and mitigation planning.

Continued Operation of Old Turbines

The SRC has recommended removal of turbines ranked 7 to 10 on a collision hazard scale and continuation of a four-month winter shutdown. Many of the SRC recommendations over the past four years have not been met according to deadlines or not followed at all (SRC document P-147). For example, the SRC repeatedly recommended that the CUP requirements be met, as fatality reductions could not be realized without mitigation actions being taken. The SRC also recommended that all unproductive turbines and vacant towers be removed. The wind companies should better inform the SRC of their actions, including which turbines were removed or relocated, and when the actions happened. The SRC recommended compliance monitoring by a trusted third party or by the SRC. The SRC requested power output data from the companies so that the SRC could test hypotheses related to patterns of collisions, leading to improved removal and relocation recommendations. The SRC recommended a focused burrowing owl behavior study in order to learn why burrowing owls are being killed at such high rates near wind turbines. The SRC also recommended a background mortality study, searcher detection trials, more aggressive behavior monitoring of flying birds, and timely processing of bird utilization monitoring. If the continued operations of old-generation turbines are to be considered in one or more PEIR alternatives, then the SRC's recommendations should be fully implemented. All old-generation turbines that are allowed to continue operating should be monitored for fatalities until the turbines are removed.

Compensatory Mitigation

As long as horizontal-axis wind turbines operate in the APWRA, birds and bats will continue to be killed by moving turbine blades. Even if potential reduction in raptor mortality due to repowering can reach 80-85%, the remaining fatality rates will be significant. Because there is no fatality-reducing or fatality-minimizing mitigation measure that will reduce the impacts below a threshold of significance under CEQA, and impacts will continue for the life of the project, compensatory mitigation will be necessary. Compensatory mitigation payment should be required from all permittees on a per megawatt basis – this funding should go toward purchase of productive raptor habitat in the Altamont region in the form of land or conservation easements to compensate for avian mortality during permit operations.

Decommissioning and Reclamation of Existing Wind Farms

The NOP states that as repowering proceeds, power poles and electrical overhead lines will be removed, but only where they are “no longer needed.” The power poles and overhead lines kill numerous birds, although estimates of annual fatality rates caused by electrocution and line strikes have yet to be made. All power poles and overhead lines at APWRA should be removed and replaced by undergrounded lines.

Mitigation Monitoring

The EIR must include and describe in detail a credible mitigation monitoring plan. Mitigation monitoring conducted so far has been grossly inadequate (see SRC document P-148) and actions allegedly taken by energy companies are often in dispute. An effective and scientifically credible avian mortality monitoring program that is independent of the permittees is needed. Given the history of noncompliance with APWRA permit conditions, any mitigation plan for wind turbine-caused fatalities must include a performance bond to be credible.

Sincerely,

Jeff Miller
Conservation Advocate
Center for Biological Diversity
351 California Street, Suite 600
San Francisco, CA 94104
Phone: (510) 499-9185
E-mail: jmiller@biologicaldiversity.org

Citations

Smallwood, K. S., and C. Thelander. 2004. Developing methods to reduce bird mortality in the Altamont Pass Wind Resource Area. Final Report to the California Energy Commission, Public Interest Energy Research -Environmental Area, Contract No. 500-01-019, Sacramento, USA.

Smallwood, K. S. 2008. Wind power company compliance with mitigation plans in the Altamont Pass Wind Resource Area. Environmental & Energy Law Policy Journal 2(2):229-285.

Smallwood, K.S. and Karas. 2009. Avian and Bat Fatality Rates at Old-Generation and Repowered Wind Turbines in California. Journal of Wildlife Management 73(7).

Smallwood, K. S., and L. Neher. 2009. Map-Based Repowering of the Altamont Pass Wind Resource Area Based on Burrowing Owl Burrows, Raptor Flights, and Collisions with Wind Turbines. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. CEC-500-2009-065. Sacramento, California. 63 pp. http://www.energy.ca.gov/2009publications/CEC-500-2009-065/CEC-500-2009-065.PDF

Smallwood, K. S. and L. Neher. 2010. Siting Repowered Wind Turbines to Minimize Raptor Collisions at the Tres Vaqueros Wind Project, Contra Costa County, California. Draft Report to the East Bay Regional Park District, Oakland, California.

Smallwood, K. S., L. Neher, and D. A. Bell. 2009. Map-based repowering and reorganization of a wind resource area to minimize burrowing owl and other bird fatalities. Energies 2009(2):915-943. http://www.mdpi.com/1996-1073/2/4/915

WEST, Inc., University of California at Santa Cruz, Predatory Bird Research Group, BioResource Consultants Inc., Jones & Stokes. 2007. Avian Fatality Monitoring at Altamont Pass Winter 05 – Spring 07. Working Draft.

DEPARTMENT OF TRANSPORTATION
DIVISION OF AERONAUTICS – M.S.#40
1120 N STREET
P. O. BOX 942874
SACRAMENTO, CA 94274-0001
PHONE (916) 654-4959
FAX (916) 653-9531
TTY 711

Flex your power!
Be energy efficient!

September 1, 2010

RECEIVED
9/7/10

Ms. Sandra Rivera
Alameda County Community Development Agency-Planning
224 W. Winton Avenue, Room 111
Hayward, CA 94544

Dear Ms. Rivera:

Re: Alameda County's Notice of Preparation of a Draft Environmental Impact Report for the Altamont Pass Wind Resources Area Revised Conditional Use Permit; SCH# 2010082063

The California Department of Transportation (Caltrans) Division of Aeronautics reviewed the above-referenced document with respect to airport-related noise and safety impacts and regional aviation land use planning issues pursuant to the California Environmental Quality Act (CEQA).

The proposal is for the modification of the existing Conditional Use Permits in order to repower (replacement of) existing towers and turbines on wind farms including two individual repowering projects, the 95 MW Summit Wind project proposed by Altamont Winds, Inc, and the 135.7 MW proposal by NextEra Energy Resources, LLC. We noted that the new turbines and towers will exceed the heights of existing turbines and towers.

California Public Utilities Code Section 21659 prohibits structural hazards near airports. For all of the proposed structures that will exceed 200 feet in height, a Notice of Proposed Construction or Alteration (Form 7460-1) will be required by the Federal Aviation Administration (FAA) in accordance with Federal Aviation Regulation, Part 77 "Objects Affecting Navigable Airspace." Form 7460-1 is available on-line at https://oeaaa.faa.gov/oeaaa/external/portal.jsp and should be submitted electronically to the FAA.

These comments reflect the areas of concern to the Division of Aeronautics with respect to airport-related noise, safety, and regional land use planning issues. We advise you to contact our District 4 office concerning surface transportation issues.

Thank you for the opportunity to review and comment on this proposal. If you have any questions, please call me at (916) 654-5314 or by email at sandy.hesnard@dot.ca.gov.

Sincerely,

Sandy Hesnard

SANDY HESNARD
Aviation Environmental Specialist

c: State Clearinghouse, Alameda County ALUC

STATE OF CALIFORNIA – THE RESOURCES AGENCY **ARNOLD SCHWARZENEGGER**, *Governor*

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

September 22, 2010

RECEIVED 9/23/2010

Alameda County Community Development Agency
Attn: Ms. Sandra Rivera
224 W. Winton Avenue, Room 111
Hayward, CA 94544

Notice of Preparation of an Environmental Impact Report for the Proposed Re-powering of Wind Generation Facilities Within the Altamont Pass Wind Resource Area, Cities of Livermore and Tracy, Alameda County, Delta Field Division, South Bay Aqueduct Milepost 0 - Milepost 7.14, SCH2010082063

Dear Ms. Rivera:

Thank you for the opportunity to review and comment on the Notice of Preparation (NOP) for an Environmental Impact Report for the proposed Wind Generation Facilities Re-powering Project within the portion of the Altamont Pass Wind Resource Area within Alameda County. The document describes a proposal by the Summit Wind (95 MW project) and Altamont Winds, Inc. (135.7 MW project) to replace and upgrade existing wind turbine and associated power generation equipment, with upgraded turbines and transformers. The proposed work will begin in 2012 and continue through 2018. Some of the access roads used by the operators of the wind turbine farms are also used by the Department of Water Resources (DWR) for maintenance of the South Bay Aqueduct (Aqueduct), part of the State Water Project, which is buried in three pipelines through the Altamont Pass Wind Resource Area.

DWR has reviewed the NOP and has the following comments regarding the proposed Wind Generation Facilities Re-powering Project:

1. DWR has recently completed constructing a new third pipeline, parallel to the two original barrels, from the South Bay Pumping Plant at Bethany Reservoir to the beginning of the open channel section of the Aqueduct near Dyer Road in Livermore. The access roads used by the Wind Farm operators cross over these pipelines in multiple locations throughout the nearly 3 linear miles of buried pipelines. DWR is concerned about the type and weight of the construction equipment crossing the pipelines and requests the opportunity to review and comment on a list of all proposed equipment prior to traffic crossing over the pipelines.

2. DWR is also concerned about maintenance of the primary access roads that are utilized by both the Wind Farm operators and DWR staff. The EIR should address the potential damage and responsibility for repair to the roads as a result of the construction activity involved in the proposed Re-powering Project.

3. Advance notice to DWR Delta Field Division and Headquarters is required prior to any work within DWR right of way. Contact Erdom Abraham of DWR Delta Field Division at (209) 833-2101 to coordinate a site visit.

4. Any construction work within DWR right of way may require an Encroachment Permit, which would be issued by DWR.

DWR's ongoing operations and maintenance activities shall not be disrupted during construction.

Information regarding forms and guidelines for submitting an application for an Encroachment Permit can be found at DWR web address:

http://wwwdoe.water.ca.gov/Services/Real_Estate/Encroach_Rel/index.cfm

Please provide DWR with a copy of any subsequent environmental documentation when it becomes available for public review.

If you have any questions, please contact Scott Williams at (916) 653-5746, or Leroy Ellinghouse of my staff at (916) 653-7168.

Sincerely,

Sheree Edwards

for David M. Samson, Chief
State Water Project Operations Support Office
Division of Operations and Maintenance

9/14/10

RECEIVED SEP 1 5 2010

Ms. Sandra Rivera

Assistant Planning Director

ATTN: Altamont Pass Wind Resource Area CUP PEIR

Alameda County Community Development Agency

224 W. Winton Avenue, Suite 110

Hayward, CA 94544

Dear Ms. Rivera:

I attended the scoping meeting in Dublin on September 2, 2010 for the planned repowering projects. The following issues need to be addressed in the PEIR to reduce current land use impacts associated with wind farm generation equipment and the infrastructure and maintenance to support them to acceptable limits.

Prior to retirement in 2006 I was the Watershed and Lands Department Manager for the Contra Costa Water District with lands in Contra Costa and Alameda Counties that contained several hundred wind turbines.

From my seven years of on-the-ground experience on the Los Vaqueros Watershed (19,380 acres) I want to point out several serious impacts that are associated with the placement and maintenance of the wind turbines and all-weather roadway and drainage systems that the stated repowering projects must address.

A) All-Weather Roadway System:

Eliminate the in-sloped all-weather roadway system and storm-water drainage collection system and replace it with a 2% out-sloped all-weather roadway system that avoids the use of ditches and drop culverts on the inside edge of the roadside.

The current roadway drainage system utilizes culverts running under the roadway that concentrates water with erosive velocity and releases it onto unprotected hill-slopes below the roadways. The result is substantial hill-slope erosion and excessive sedimentation that creates impacts in downstream waterways, ponds and wetlands.

<u>*For example:*</u>

Excessive sedimentation fills vernal pools, seasonal wetlands, ponds and reservoirs, reducing their effective long-term life as important water storage facilities on watershed lands.

Excessive sedimentation impacts protected habitats, plants, invertebrates and vertebrates that rely on these waterways and wetlands.

Excessive sedimentation accelerates eutrophication impacts in downstream water storage reservoirs such as Los Vaqueros.

Excessive sedimentation impacts invertebrate and fishery resources in downstream water storage reservoirs.

B) Reclamation of the current turbine pads, all-weather roadway system, inside ditches and culverts:

It is *easy* to make the comment that the current infrastructure for the wind farm facilities will be removed and the area returned to the condition it was in previous. However, based on my watershed management experience over the last 40-years I can say that it is exceedingly difficult to implement that statement honestly.

What will be done to *insure* land owners that the reclamation project will be successful and will not create soil wasting, excessive soil erosion and resulting sedimentation impacts?

Will all the road base rock that has been added to the roadway and pad systems be removed from the watershed or are you planning to re-use the material or stockpile it somewhere for future use?

Will the suite of non-native but indigenous and beneficial annual grasses and forbs be seeded over the areas reclaimed? Would the seeding be done by hand or by hydro-seeding? And, would this be accomplished before the first rains in October or in some other month?

Please note that re-seeding large areas with perennial plants (if that is contemplated) on the Los Vaqueros Watershed were exceedingly expensive, time consuming and were not successful.

Sandra: Just a Heads Up that the e-mail address listed to provide comments on the repowering project did NOT WORK. Sent it several times and each was returned.

Sincerely,

Robert C. Nuzum

Robert C. Nuzum

Owner and Lead Scientist

Applied Natural Resource Management

www.nuzumconservation.com

1072 Juanita Drive

Walnut Creek, CA 94595

Certified Fisheries Scientist Emeritus

Ohlone Audubon Society, Inc.

A chapter of the National Audubon Society
Serving Southern Alameda County, CA

Sandra Rivera
Assistant Planning Director
Alameda County Community Development Agency
224 W. Winton Avenue, Suite 110
Hayward, CA 94544

Sept.23, 2010

Subject: Notice of Preparation for Altamont Pass Wind Farms

Dear Ms. Rivera,

Ohlone Audubon Society has had a long standing interest in the wind farms on Altamont Pass. Needless to say we have been deeply concerned about avian mortality at that site.

Much effort has been expended to address the mortality factor while yet allowing a renewable energy project to go forward. But repowering the wind turbines cannot be allowed to go forward unless the 50% or more of bird kills are not reduced in the future starting with this repowering effort.

In the past the shutdowns were not completely implemented and to my knowledge the plan to paint some of the wind turbine blades did not happen. So I am concerned that mitigation and monitoring will be strictly enforced for this project.

There is some concern that some of the wind power companies are hoping to expand into eastern Alameda County. Ohlone Audubon wants to be sure that the current boundaries will be adhered to.

Also Ohlone Audubon Society wants a Scientific Review Committee established that will be totally creditable and its recommendations given full weight of adherence.

An Adaptive Management Plan needs to be in place in order to proceed in an orderly and scientifically sound manner in order to meet the avian mortality reduction goals set. It seems to us that either "take" or fines should be assessed if the wind turbine companies fail to carry out their repowering responsibilities in full as far as the safety of birds and we should add bats also as a concern..

Yours truly,

Evelyn M. Cormier

Evelyn M./ Cormier, President
Ohlone Audubon Society
1922 Hillsdale St., Hayward CA 94541

CONTRA COSTA
WATER DISTRICT

1331 Concord Avenue
P.O. Box H2O
Concord, CA 94524
(925) 688-8000 FAX (925) 688-8122
www.ccwater.com

September 29, 2010

VIA FACSIMILE (510) 785-8793
Hard Copy to Follow

Ms. Sandra Rivera
Assistant Planning Director
Community Development Agency
Alameda County
224 W. Winton Ave., Suite 110
Hayward, CA 94544

Subject: Receipt of Request for Comments on a Notice of Preparation for a Program EIR for the Altamont Pass Wind Resource Area (APWRA) revisions to Conditional Use Permits (CUPs) for repowering and continued maintenance and operation of wind turbines in Alameda County

Dear Ms. Rivera:

The Contra Costa Water District (CCWD) is in receipt of the August 25, 2010 request for comments on a Notice of Preparation (NOP) for a Program Environmental Impact Report (EIR) for the Altamont Pass Wind Resource Area (APWRA) revisions to Conditional Use Permits (CUPs) for repowering and continued maintenance and operation of wind turbines in Alameda County. CCWD serves treated and untreated water to approximately 550,000 people in Central and Eastern Contra Costa County. CCWD owns the 100,000 acre-foot Los Vaqueros Reservoir and the approximately 20,000 acre watershed surrounding the reservoir within Contra Costa and Alameda Counties. Within the Los Vaqueros Watershed there are numerous existing wind turbines, but they are in limited areas.

A portion of the APWRA Conservation Plan area and CUP Permit area is within Los Vaqueros Watershed property owned by CCWD within Alameda County (see Figure 1, attached). CCWD recorded a conservation easement in favor of the California Department of Fish and Game (DFG) on September 8, 1994 for the protection of the San Joaquin Kit Fox and other wildlife species (Conservation Easement) and a portion of this easement area is within the APWRA. The shaded area within Figure 1 illustrates the Conservation Easement area that has been conveyed to the DFG by CCWD within Alameda and Contra Costa Counties.

The Conservation Easement is 4,150 acres and most of these lands are within Contra Costa County. However, the Conservation Easement extends into Alameda County. There are no existing wind turbines within the DFG Conservation Easement areas owned by CCWD in either Alameda or Contra Costa Counties.

Wind development within the Conservation Easement would require re-consultation of the September 3, 1993 U.S. Fish and Wildlife Service (USFWS) Biological Opinion (BO) on the construction and operation of the Los Vaqueros Reservoir within the Los Vaqueros Watershed. The USFWS BO describes land management objectives and practices for the Los Vaqueros Watershed property. The February 17, 1994 DFG Memorandum of Understanding (MOU) on the Los Vaqueros Project would also be subject to review should wind power be proposed within the Conservation Easement.

CCWD has not agreed to consider wind development agreements on properties it owns within the Conservation Easement area. Such an action could result in new resource agency (USFWS and DFG) consultations related to the Los Vaqueros Watershed and reservoir, and any implementation could result in significant impacts, including impacts to listed and other species within the Conservation Easement and the watershed as a whole. All APWRA environmental issues potentially affecting CCWD facilities and properties should be included in the EIR. CCWD requests that the APWRA Draft EIR fully acknowledge the Conservation Easement and that there is no agreement that wind development will be permitted in this area.

Please contact me at CCWD (925) 688-8119 should you have further questions.

Sincerely,

Mark A. Seedall

Mark A. Seedall
Principal Planner

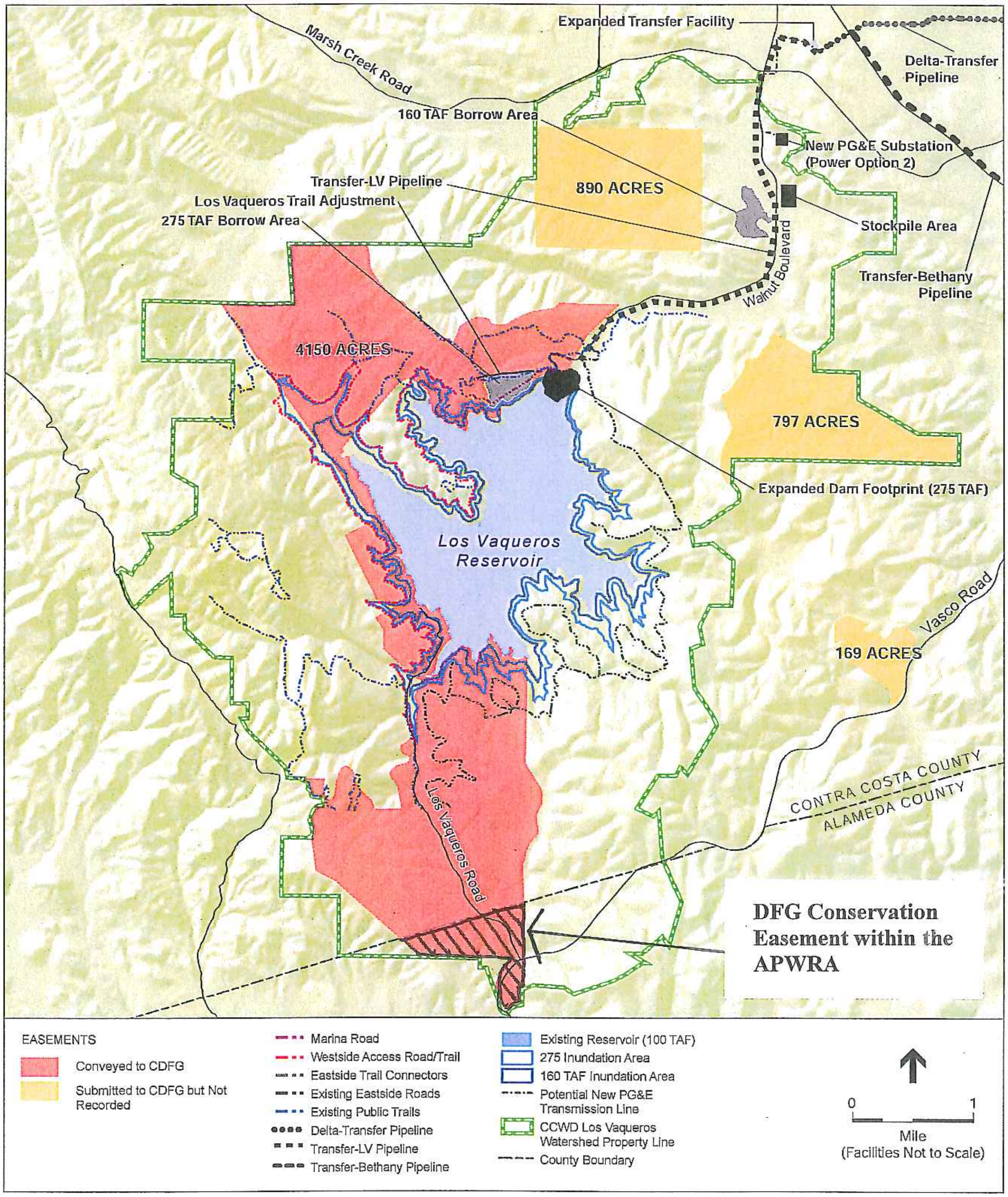
MAS/jmt/rlr

Attachment

cc: Ryan Olah USFWS
Scott Wilson DFG
Will Nelson Contra Costa County

Contra Costa Water District
Los Vaqueros Watershed & California Dept. of Fish & Game Conservation Easement **Figure 1**

Altamont Pass Wind Resource Area NOP, September, 2010



SOURCE: USGS, 1993 (base map); CNDDB, 2007; and ESA, 2007

Post-it® Fax Note 7671	Date 10/7/10	# of pages ▶ 3
To Sandra Rivera	From Barbara Salzman, Marin Audubon S.	
Co./Dept.		
Phone #	Phone # 415 924-6057	
Fax #	Fax #	

Marin Audubon Soc

P.O. Box 599 | Mill Valley, CA 94942-0599 | MARINAUDUBON.ORG

October 7, 2010

Sandra Rivera
Assistant Planning Director
Alameda County Community Development Agent
224 W. Winton Avenue, Suite 110
Hayward, CA 94544

RE: Notice of Preparation for the APWRA

Dear Ms. Rivera:

The Marin Audubon Society appreciates the opportunity to submit comments on the NOP for the Altamont Pass Wind Resource Area revisions to the Conditional Use Permits for repowering and continued maintenance. Altamont has a long history of environmental devastation particularly for golden eagles and other raptors. Because of our concern about the very significant impacts to raptor and other bird populations, Marin Audubon is a party to the Audubon law suit. Our goal is to ensure that impacts to avian resources are avoided or at least significantly reduced.

Repowering components of the current project as described in the notice of preparation include: for Summit Wind Project would replace 1,394 wind turbines, with 60 modern turbines, 150 feet tall, with 271 foot diameter blades on 7,650 acres; and for NextEra Project would install up to 59 turbines each approximately 428 feet high plus meteorological towers on 8,950 acres. The maintenance components of the project are not clearly defined.

The PEIR should be prepared with the following legal framework. CEQA requires that a program EIR provide the in-depth analysis of a large project, looking at effects "as specifically and comprehensively as possible." CEQA Guidelines § 15168(a), ©)(5). Because it looks at the big picture, a program EIR must provide "more exhaustive consideration" of effects and alternatives than can be accommodated by an EIR for an individual action, and must consider "cumulative impacts that might be slighted by a case-by-case analysis." CEQA Guidelines § 15168(b)(1)-(2). Further, a programmatic EIR "[allows the lead agency to consider broad policy alternatives and program wide mitigation measures at an early time when the agency has greater flexibility. . . ." CEQA Guidelines § 15168(b)(4). It is instead an opportunity to analyze impacts common to a series of smaller projects, in order to avoid repetitious analyses.

We request that the Draft PEIR provide the following:

Description of the project setting including vegetation and wildlife that currently use the site.

A detailed description of the proposed project, including description of proposed turbines and all other facilities, where they would be located where they will be placed, as well as anticipated maintenance actions. Specifically, because the NOP contains a brief but specific description of the proposed construction activities, it is unclear why a program EIR is being used. What other subsequent actions are proposed and/or anticipated.

A discussion of how the turbines differ from existing turbines and how they would be expected to impact birds and other wildlife differently. Where have they been used before and what were the impacts resulting from that use? Is it expected that adverse impacts from the whole of the project and from individual turbines would be avoided or reduced? Provide data to demonstrate that impacts would be expected to be avoided or reduced.

Evaluate the proposed location for the turbines. Discuss the bird use of the proposed area. Are there other less potentially damaging areas where that should be considered that would be less damaging to birds should be considered.

Summit's turbines would be encased in an approximately 262-foot high tubular steel tower. Evaluate the potential impact of this structure on birds? There would also be an electrical collection system between the turbines. What would this system consist of? How could they impact birds? Over how much of the area would the overhead spans be required?

Discuss and evaluate the benefits/impacts of the different possible methods (removal or burial) to remove existing facilities. How much of the editing access road would be removed and how much would remain?

What is the purpose of the meteorological towers proposed by NextEra? If NextEra is already operating turbines and proposing to replace them with new turbines, presumably they know about the wind in the area. Would the meteorological towers be in a different location?

Are there turbine designs other than the ones proposed that would provide impacted protections for birds/bats that could be used?

Mitigation measures should be effective and enforceable. The mitigation discussion should consider the following measures: closing down the turbines during high bird use times and when that would be; reducing the number of turbines; removal of higher risk turbines; using different designs (if such exist); and placing them in other less damaging locations.

Describe bird and bat surveys that are proposed to be conducted by the applicants. Evaluate their compliance with the protocols recommended in the *"California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development."* Will the data from the surveys be available to the county and all interested parties. All wildlife survey collected by the applicants should be made available to the public.

Discuss the history of compliance with the negotiated settlement agreement to the Audubon suit. What conditions will ensure compliance with permit conditions? What penalties could be put into place to better ensure compliance?

A clearly defined adaptive management program with requirements that are enforceable and effective. The proposed program should be included in the DPEIR so that its adequacy can be evaluated.

Project Alternatives should include:

- Reduced project alternative that would preferable avoid or reduce project impacts to less than significant.
- Locating turbines in a different place.

Thank you for responding to our questions.

Sincerely,

Barbara Salzman, Co-chair
Conservation Committee

Phil Peterson, Co-chair
Conservation committee

COMMENTS ON THE NOTICE OF PREPARATION FOR A PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT ON REVISED CUPs FOR WIND TURBINES IN THE ALAMEDA COUNTY PORTION OF THE ALTAMONT PASS

Michael E. Boyd President,
CAlifornians for Renewable Energy, Inc. (CARE)

08 October 2010

CAlifornians for Renewable Energy, Inc. (CARE) appreciates the opportunity to comment on the Notice of Preparation (NOP). Our comments follow.

We incorporate by this reference the SRC's integrated comments on the NOP, SRC document P183 v. 9-28-10 2 PM.

Introduction

The County of Alameda (County) in issuing its Notice of Preparation (NOP) of a Programmatic Environmental Impact Report (PEIR) for the Altamont Pass Wind Resource Area revised conditional use permits (CUPs)(proposed project) within the Alameda County portion of the APWRA in northern California.

The County is proposing to issue revised CUPs to wind power companies that are currently operating wind turbines in the APWRA. Purportedly the PEIR will be prepared in compliance with the California Environmental Quality Act (CEQA) and all relevant state and Federal laws. CARE respectfully disagrees. The County will serve as the lead agency under CEQA for preparation of the PEIR, but the NOP for the PEIR has failed to identify the lead federal agency to insure compliance with Federal laws protecting wildlife impacted by the existing operations from harm.

The reason given by the County is its intentional bifurcation of the environmental process so as to confound meaningful and informed participation stating "[c]oncurrent with preparation of this PEIR, the County is also preparing a Habitat Conservation Plan /Natural Community Conservation Plan (HCP/NCCP) and joint Program Environmental Impact Statement/Environmental Impact Report (PEIS/PEIR) under the National Environmental Policy Act (NEPA) and CEQA, respectively. The United States Fish and Wildlife Service (Service) will serve as the federal lead agency under NEPA. *This Notice is being issued to comply with CEQA requirements for the revised CUPs only.* An additional, but separate, scoping process is anticipated to be held in fall of 2010 by the County and the Service for the HCP/NCCP PEIS/PEIR."

Integrated EIR/EIS process serves the public interest of participation

Some reasons why to combine NEPA/CEQA environmental review process are it combines compliance for federal, state and local laws in one document, it provides one point of reference for public and agency reviewers, it coordinates efforts to save time and money.

CEQA encourages use of NEPA documents (with addition of certain CEQA discussions) if available prior to CEQA review (15221(a)) and CEQ NEPA regulations and CEQA Guidelines encourage integration NEPA. “To the fullest extent possible,” NEPA documents should be integrated with other laws. (40 CFR §§1502.25 and 1506.2).

Mitigation measures

An EIR must identify and describe measures which could reduce or avoid each significant environmental impact of the project (14 Cal. Code Regs. §15126(b)(3)) For any significant impact, the EIR must propose and describe feasible mitigation measures that could avoid or substantially lessen the significant environmental effects of the project. (Pub. Res. C §§ 21002.1 21100; 14 Cal Code Regs.§ 15126.4.)

NEPA EIS
• Must discuss mitigations for all impacts, even those not significant
• But, does not require agency to adopt mitigations in EIS
• Mitigations listed in ROD or FONSI are however enforceable and must have a monitoring program

CEQA EIR
• Must identify mitigation measures for significant impacts AND adopt feasible measures
• Requires a mitigation monitoring and reporting program (MMRP) for those measures adopted
• For EIR, findings required to reject mitigation as infeasible

We object to the fact that the NOP does not identify a continued role for the SRC going forward nor does it identify any changes to its roles and responsibilities continuing forward to be addressed either in the scope of the CUP PEIR nor has it been identified within the scope of the NCCP/HCP PEIS/PEIR.

Scope of the NEPA/CEQA Project/Action

• Scope of projects/actions
– CEQA: Whole of action with potential for environmental impact
• Segmentation/piecemealing prohibited
– NEPA: can be more limited to federal control/jurisdiction, but must consider “connected actions”
• Segmentation/piecemealing also prohibited, but federal agencies have more discretion to limit scope for proposed actions than under CEQA
– Joint CEQA/NEPA documents often have broader scope CEQA projects and narrower scope NEPA proposed actions

Unlawful bifurcation

A "project" is a discretionary activity directly undertaken by any public agency, or an activity involving issuance of a lease, permit, license, certificate, or other entitlement for use by one or more public agencies (14 Cal Code Regs. §15378). The "whole of an action" includes not just specific approvals, but the underlying activity, as well as the development or activity that could result from the approval. No "piecemealing", a single project may not be divided into smaller pieces for individual environmental reviews that don't account for the projects overall impacts. *Association for a Cleaner Environment v. Yosemite Community College Dist* (2004) 116 Cal.App.4th 629 as modified, 10 CR3d 560 and *citizens Ass'n for Sensible Dev. of Bishop Area v County of Inyo* (1985) 172 Cal.App.3d 151.

Conclusions

The NOP of the proposed bifurcated of the CUP PEIR and NCCP/HCP PEIS/PEIR fails to comply with CEQA and NEPA in six distinct ways. First, by separating the CUP environmental review from the conservation plan the CUP PEIR will omit essential information and, as a result, will fail as an informational document. Second by bifurcating the environmental review process the CUP PEIR will unlawfully defer the formulation of various studies and mitigation measures. Third, significant unstudied changes could have to be made to the Project after the PEIS/PEIR release, and significant new information is planned to be added to the CUP PEIR at a future date, so the original CUP PEIR must be re-circulated and an additional public comment period be provided. Fifth, the discussion of Alternatives in the CUP PEIS will be inadequate insofar as the requirements for the FEIS, its No-action alternative, and requirements with the Applicant's purpose and need could be different than those identified in the PEIS/PEIR. Sixth, the CUP PEIS will unlawfully segment the Project by failing to consider the impacts of the HCP/NCCP. CARE recommends the CUP PEIS and HCP/NCCP PEIS/PEIR be combined or the HCP/NCCP PEIS/PEIR be eliminated all together until the CUPs are brought in to compliance with their existing terms and conditions and the recommendations of the SRC.

Respectfully Submitted,

Michael E. Boyd

Michael E. Boyd President
CAlifornians for Renewable Energy, Inc.
(CARE)
5439 Soquel Drive
Soquel, CA 95073
Phone: (408) 891-9677
E-mail: michaelboyd@sbcglobal.net

Lynne Brown

Mr. Lynne Brown Vice-President
CAlifornians for Renewable Energy, Inc.
(CARE)
24 Harbor Road
San Francisco, CA 94124
E-mail: l_brown369@yahoo.com

October 8th, 2010

Verification

I am an officer of the Commenting Corporation herein, and am authorized to make this verification on its behalf. The statements in the foregoing document are true of my own knowledge, except matters, which are therein stated on information and belief, and as to those matters I believe them to be true.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 8th day of October 2010, at San Francisco, California.

Lynne Brown

Lynne Brown Vice-President
CAlifornians for Renewable Energy, Inc. (CARE)

James and Martha Hodges Family Trust
3210 Main Street
Morro Bay, CA 93442

September 16, 2010

Sandra Rivera
Assistant Planning Director
Alameda County Community Development Agency
224 W. Winton Avenue, Suite 110
Hayward CA 94544

Subject: Notice of Preparation (Notice) of a Program Environmental Impact Report (EIR) for the Altamont Pass Wind Resource Area (APWRA) revisions to Conditional Use Permits (CUPs) for repowering and continued maintenance and operation of wind turbines in Alameda Country.

Dear Ms Rivera:

The James & Martha Hodges Family Trust are in receipt of the above subject notice. As co-trustees of this property, located at 7010 Vallecitos Road (Hwy 84), Sunol CA, parcel no's: 96-365-3-2 & 96-365-5, the Trust has expressed concerns regarding the direct and indirect impacts of your proposed project which includes modification to existing CPUs for repowering of existing wind farms and the associate power operation and maintenance activities within the Alameda County portion of the APWRA.

The Summit Wind Project proposes the replacement of existing, aging wind farm equipment with modern wind turbines for the purpose of delivering wind generated electrical energy to the Pacific Gas & Electric Company (PG&E). The Summit proposal also includes: Decommissioning and reclamation of existing wind farms and construction of new larger wind turbines that once ranged from 100 kW – 370 kW with an increased capacity of 1600kW; herein is our concern.

Though the Summit Wind Project is located in the Altamont Pass geography, the expanded capacity of electrical energy generated by the upgraded wind turbines will be processed in partnership with PG & E whose tower electrical systems/lines extend for miles across private land; such as ours. If new and or upgraded wind turbines are increased in capacity, we believe this will directly affect PG & E's current electrical lines thus also requiring upgrades to receive the expansion in electrical resource generated by your/subject project.

Please respond to our concerns by listing the direct and indirect impacts to our property caused by the proposals detailed per the above subject matter. Also be aware that we are adverse to any electrical increases to the existing transmission lines that cross our property, this also includes potential upgrades to existing lines and/or new installations. Such upgrades to accommodate the Summit Wind Project for the purpose of transmitting increased energy will subject our property to limited development thus hindering future sale of both parcels.

Respectfully,

Eileen L. Earhart
Co-Trustee of the James and Martha Hodges Family Trust

Cc: James R. Hodges & David L. Hodges/ Co-Trustees of the James and Martha Hodges Family Trust

COMMENTS ON THE NOTICE OF PREPARATION FOR A PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT ON REVISED CUPs FOR WIND TURBINES IN THE ALAMEDA COUNTY PORTION OF THE ALTAMONT PASS

Shawn Smallwood, Jim Estep, Sue Orloff, Joanna Burger, and Julie Yee
Alameda County Scientific Review Committee

28 September 2010

The Alameda County Scientific Review Committee (SRC) appreciates the opportunity to comment on the Notice of Preparation (NOP). Our comments follow.

CEQA REVIEW PROCESS

The SRC is concerned that the proposed environmental review process is too confusing. There are two major points of confusion: (1) The Combining of existing CUPs and the two repowering projects into a single 'project' for purposes of CEQA review; and (2) the combining of the review processes between the Programmatic Environmental Impact Review (PEIR) and a future EIR/EIS (Environmental Impact Statement) for a proposed Natural Communities Conservation Program/Habitat Conservation Plan (NCCP/HCP). Contributing to the first point of confusion, the analysis of existing projects is limited to operations of existing wind turbines while the analysis of the repowering projects includes the removal of existing wind turbines and the siting of entirely new wind turbines. Analyzing impacts cumulatively will potentially deemphasize the effects of the existing projects due to the benefits derived from repowering. Analyzing impacts on a project by project basis would be more appropriate, but also more appropriately lends itself to separate EIRs (repowering EIR and Existing CUP EIR). Contributing to the second point of confusion, the NOP indicates that the PEIR will be integrated into the EIR/EIS to be prepared for the NCCP/HCP, but the SRC lacks information about the mitigation measures under consideration for the NCCP/HCP.

The NOP's announcement that the PEIR will be integrated with the EIR/EIS for the NCCP/HCP left the SRC with many concerns, including the following. It is unclear whether the permit periods would be consistent between the two planning processes, or whether the permit period following the PEIR would be later modified to match the permit period of the NCCP/HCP. It is unclear whether the list of wildlife species considered in the impact assessments of the PEIR would be the same as the list in the NCCP/HCP. It is unclear whether the thresholds of significance would be the same, especially considering the recovery standard required of NCCPs. It is also unclear to what extent the CUPs following the PEIR certification would be revised by the EIR/EIS for the NCCP/HCP. The SRC sees little sense in the County's preparation of an EIR that will be rendered obsolete by another EIR/EIS, especially one that is directed to the same environmental impacts and involving the same limited suite of mitigation options.

The SRC recommends that Alameda County change the sequence of environmental planning and review steps announced in the NOP, so that there is no integration of environmental review documents at an unspecified, later date. Alameda County should either eliminate plans to prepare an NCCP/HCP or it should roll the plans together at the outset. The history of the

APWRA harbors a series of complicated mitigation agreements that proved ineffective at reducing avian and bat fatalities.[1] Given this history, and given the magnitude of the ongoing environmental impacts, the environmental review at hand should be simple and comprehensible.

Furthermore, the way it is worded, the NOP might give a misleading impression that another mitigation strategy prepared for the NCCP/HCP would be superior to the strategy directed toward the PEIR. The available suite of mitigation measures have been reviewed by the Alameda County Scientific Review Committee (SRC) for four years. The SRC members are experienced with fatality monitoring and research in the APWRA. The SRC does not expect another conservation strategy will be developed that will be more effective.

The SRC feels that the NOP would have been more informative had it identified the probable environmental effects and issues. The SRC feels that more description of the project would have been helpful, including the following:

- A table of the number of new turbines likely to be used in repowering projects and the number of old turbines to be removed;
- It should be clarified whether the repowering projects would occur within the same project boundaries as the existing old-generation turbines, or whether there are plans for project area expansions;
- The siting of new turbines should rely on the SRC's siting guidelines;[2]
- It should be clarified whether landowners have a say in whether existing roads are removed, and whether land-owner considerations fit into land use planning;
- APWRA's neighboring landowners should have adequate opportunity to raise to have their concerns and issues addressed in the review process;
- Audubon Society and Californians for Renewable Energy (CARE) should share in any oversight role(s);
- The PEIR should include a complete list of the original and amended CUPs dating back to 2005, so that there is no confusion among members of the public about the origins and relevancies of the CUPs; and,
- It should be clarified whether repowering projects not mentioned in the NOP, i.e., additional to Summit Wind and NextEra, could be developed within the permit period

[1] Smallwood, K. S. 2008. Wind power company compliance with mitigation plans in the Altamont Pass Wind Resource Area. Environmental & Energy Law Policy Journal 2(2):229-285.

[2] Alameda County SRC (Smallwood, K. S., S. Orloff, J. Estep, J. Burger, and J. Yee). 2010. Guidelines for siting wind turbines recommended for relocation to minimize potential collision-related mortality of four focal raptor species in the Altamont Pass Wind Resource Area. Alameda County SRC document P-70. P70 SRC Hazardous Turbine Relocation Guidelines

following the PEIR. If other projects are allowed, then evaluating impacts separately or site-wide for unforeseen future projects is going to be difficult. But if no other projects can be considered, then this will situation will hinder the progress of repowering.

Finally, the SRC notes that its effective comment period on the NOP was too short. By the time the SRC was able to meet on this issue, only days remained before the end of the comment period. The SRC feels that it was unable to sufficiently review the NOP and needed more time to prepare meaningful comments.

PROJECT ALTERNATIVES

The SRC is unclear how the PEIR in general and particularly the Alternatives Analysis will be presented, given that there are two vastly different elements to the 'project,' i.e., existing operations at old projects and repowering projects. This said, the SRC suggests the following alternatives be considered in the Programmatic Environmental Impact Report (PEIR):

(1) No project – shutdown of all turbines and no repowering;

(2) No change to turbine models and turbine operations;

(3) Complete repowering to modern wind turbines with careful siting to minimize environmental impacts;

  a. Relocated project -- removal of existing turbines, but repowering in another geographic area within or outside of the APWRA with less mortality potential;
  b. Reduced operations (seasonal shutdowns);

(4) Partial repowering and partial continued operations of old turbines, where for the old turbines the following additional alternatives should be considered:

  a. Partial decommissioning of turbines;
  b. Seasonal shutdown;
  c. Removal of all turbines rated 7 or higher by the SRC;
  d. Removal of unproductive turbines and vacant towers;

(5) Reduced project -- fewer removals of old turbines and fewer new turbines, or removal of all existing turbines within the repowered area, but fewer new turbines.

The SRC is concerned that there may not be a reasonable way to combine these elements in order to conduct an alternatives analysis for the entire project (existing and repowering elements).

IMPACTS ANALYSIS

Turbine configurations and conditions will change with repowering, attrition, and removals. The SRC is concerned about how the impacts will be assessed with these ongoing changes, which will continue to alter the impact levels. It's like evaluating a moving target. Reassessments of potentially hazardous turbines and conditions would need to be made regularly and then mitigation measures adjusted accordingly, one set for old-generation turbines and another set for repowered turbines.

It appears that the PEIR will address the impacts of current operations relative to the existing CUPs. Then, once the HCP/NCCP is completed, the county will amend as necessary the existing CUPs to include conservation, avoidance, and minimization measures. The description appears to imply that the HCP/NCCP avoidance and minimization measures will be the primary method of mitigating impacts for existing projects. This situation raises two concerns with the SRC:

a) Whether the PEIR would be able to reach significance conclusions pursuant to CEQA prior to the completion of the HCP/NCCP; and,

b) Whether the county is assuming that the HCP/NCCP avoidance and minimization measures will reduce impacts to levels of less-than-significant.

The PEIR should evaluate and calculate impacts related to avian mortality using the information generated from the monitoring program and available on the SRC website. Based on these data, the PEIR should then determine the significance of the impacts pursuant to CEQA guidance. The PEIR should define significance thresholds for each affected species or species group, both on a local and regional level. The analysis should investigate the number of birds or bats of each potentially affected species or species group that can be removed from a population before reaching biological significance pursuant to CEQA guidance. If impacts are determined to be significant, mitigation measures can then be applied to minimize the impact, which should include turbine removal, in an effort to reach a level of less than significant. The alternative is for the County to issue overriding considerations.

The SRC is further concerned over how the PEIR will address golden eagle mortality relative to its status as a Fully Protected (i.e., no take) species in California. Golden eagle mortality will occur and cannot be fully eliminated under the proposed project descriptions, and as a Fully Protected species, there is no provision for take under state law.

The SRC recommends that avian and bat mortality be analyzed both on an APWRA-wide basis and on a project by project basis. This approach would prevent individual companies who are not repowering from not doing their share to reduce fatalities caused by their projects. The impact assessment should address avian and bat mortality for each project component individually; that is, (1) existing CUPs, (2) Summit Repowering, and (3) NextEra Repowering.

MITIGATION ALTERNATIVES

Repowering

Repowered turbines need to be carefully sited to minimize collision hazards to birds and bats, and to minimize grading impacts caused by construction of access roads and turbine laydown areas. Siting should be guided by (1) patterns of fatality rates among APWRA wind turbines, (2) flight patterns of species of greatest concern (e.g., golden eagle, red-tailed hawk, American kestrel, burrowing owl), and (3) the spatial distribution of burrowing owl burrows. Siting methods were recently developed,[3] and they were advanced further, specifically for Contra Costa County repowering projects.[4]

Post-construction fatality and utilization monitoring lasting three years should be required. The effects of repowering on fatality rates and habitat displacement (avoidance effects) need to be quantified to inform future permit renewals and mitigation planning.

Additional studies may need to be conducted to assess the impacts to bats – such as studies on seasonal and spatial distributions, and migratory and other movement patterns.

It would be important to consider the difficultly in evaluating, avoiding, and mitigating for impacts to the state and federally listed California tiger salamander. These animals occur throughout the APWRA and can be found not only in ground squirrel burrows, but also pocket gopher burrows, crevices, or under rocks. Detecting presence when they are underground is difficult and time consuming. California red-legged frogs similarly aestivate in mammal burrows away from water, and these are difficult to detect in surveys. A section 7 consultation with USFWS would be needed before any decommissioning takes place.

Continued operation of old turbines

The SRC recommended removal of turbines they ranked 7 to 10 on a collision hazard scale. They also recommended the continuation of a four-month winter shutdown. Over the past four years, the SRC made many other recommendations, most of which were not followed in a timely

[3] Smallwood, K. S., and L. Neher. 2009. Map-Based Repowering of the Altamont Pass Wind Resource Area Based on Burrowing Owl Burrows, Raptor Flights, and Collisions with Wind Turbines. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. CEC-500-2009-065. Sacramento, California. 63 pp. http://www.energy.ca.gov/2009publications/CEC-500-2009-065/CEC-500-2009-065.PDF

Smallwood, K. S., L. Neher, and D. A. Bell. 2009. Map-based repowering and reorganization of a wind resource area to minimize burrowing owl and other bird fatalities. Energies 2009(2):915-943. http://www.mdpi.com/1996-1073/2/4/915

[4] Smallwood, K. S. and L. Neher. 2010. Siting Repowered Wind Turbines to Minimize Raptor Collisions at the Tres Vaqueros Wind Project, Contra Costa County, California. Draft Report to the East Bay Regional Park District, Oakland, California.

fashion or not followed at all.[5] For example, the SRC repeatedly recommended that the CUP requirements be met, as fatality reductions could not be realized without mitigation actions being taken. The SRC also recommended that all unproductive turbines and vacant towers be removed. The wind companies should better inform the SRC of their actions, including which turbines were removed or relocated, and when the actions happened. The SRC recommended compliance monitoring by a trusted third party or by the SRC. The SRC requested power output data from the companies so that hypotheses related to patterns of collisions, leading to improved removal and relocation recommendations could be tested. The SRC recommended a focused burrowing owl behavior study in order to learn why burrowing owls are being killed at such high rates near wind turbines. The SRC also recommended a background mortality study, searcher detection trials, more aggressive behavior monitoring of flying birds, and timely processing of bird utilization monitoring. If the continued operations of old-generation turbines are to be considered in one or more PEIR alternatives, then the SRC's recommendations should be fully implemented.

All old-generation turbines that are allowed to continue operating should be monitored for fatalities until the turbines are removed.

Compensatory mitigation

No matter which model of horizontal-axis wind turbines operate in the APWRA, birds and bats will continue to be killed by moving turbine blades. Even reducing raptor mortality 80-85% due to repowering, the remaining fatality rates should be considered significant. There is no fatality-reducing or fatality-minimizing mitigation measure that will reduce the impacts below a threshold of significance under CEQA. Therefore, compensatory mitigation will be necessary.

Compensatory mitigation should be based on a nexus between a project's adverse impacts and the benefits gained through the mitigation. Although some consideration should be devoted to finding this nexus, in reality it will be very difficult to arrive at such a nexus due to the nature and magnitudes of the impacts. The impacts will continue for the life of the project(s), and they will affect some species that lack distinct taxonomic units or "populations" within the APWRA. Most of the species affected are migratory, using the APWRA briefly or for only part of the year. It may be impossible to rely on habitat restoration or habitat protections as a means to replace the annual numbers of birds and bats killed by wind turbines in the APWRA. Therefore, a simpler, arbitrary compensatory mitigation ratio may be needed. Furthermore, a compensatory mitigation ratio may still fail to lessen impacts to *less than significant* for the simple reason that many of the birds being killed in large numbers cannot be taken under the Migratory Bird Treaty Act.

Setting aside non-development zones within the Altamont would also be an option for compensatory mitigation. Using existing bird use data to design possible movement corridors through the Altamont would be useful.

[5] Smallwood, S. 2010. Summary of Alameda County SRC Recommendations and Concerns and Subsequent Actions. http://www.altamontsrc.org/alt_doc/p147_smallwood_summary_of_src_recommendations_and_concerns_1_11_10.pdf

Decommissioning and reclamation of existing wind farms

The NOP states that as repowering proceeds, power poles and electrical overhead lines will be removed where they are no longer needed. The SRC recommends that all the power poles and overhead lines are removed; they should be replaced by undergrounded lines. The power poles and overhead lines kill numerous birds, although estimates of annual fatality rates caused by electrocution and line strikes have yet to be made.

If overhead lines and power poles must be used, then the SRC recommends they be limited to locations where they will not pose a substantial hazard to raptors. The SRC has noticed trends in American kestrel fatalities at wind turbines corresponding with nearness to power poles. The SRC believes American kestrels routinely perch on power poles, and that adjacency of power poles to wind turbines on steep slopes, in ridge saddles, and in notches or breaks in slope has been associated with disproportionate numbers of American kestrel fatalities. The SRC recommends maintaining as much distance as possible between power poles and intervening line spans from wind turbines, and especially from wind turbines in hazardous settings. The SRC also notes that its hazard ratings of wind turbines documented where many dangerous settings occur in the APWRA, but not all dangerous settings were documented.

The NOP and the PEIR should define what is meant by the phrase 'no longer operable.' It seems like the county might consider requiring some specific level of turbine operation per turbine and per project. Can 90 percent of the turbines remain non-functioning as long as 10% are operating? The SRC suggests that perhaps decommissioning should occur on a turbine basis rather than waiting for the 'project' to become non-operable.

The NOP made no mention of monitoring the reclamation efforts to verify that restoration has been successful. This will ensure that cables are sufficiently buried, vegetation has been established, and erosion has been controlled. Monitoring would also provide information on other needed restorations and identify any remedial actions.

Biological surveys would also need to be conducted before any reclamation activities, so that the work can be tailored to the specific needs of the site. For example, re-contouring the land or removing foundations could impact sensitive species that occupy underground burrows such as California tiger salamander or burrowing owls.

MITIGATION MONITORING

The PEIR should detail a credible mitigation monitoring plan as required under CEQA. The monitoring conducted so far – termed compliance monitoring as part of the Alameda County Avian Wildlife Protection Program – has been grossly inadequate.[6] Actions allegedly taken by the wind companies were often in dispute, and the timing and magnitude of the actions were always vague and confusing. A trusted third party is needed to perform this monitoring.

[6] Smallwood, S. 2010. Progress of Avian Wildlife Protection Program & Schedule. http://www.altamontsrc.org/alt_doc/p148_smallwood_progress_of_avian_wildlife_protection_program_1_11_10.pdf

October 8, 2010

Sent via electronic mail on October 8, 2010 to APWRACUPEIR@acgov.org

Sandra Rivera
Assistant Planning Director
Alameda County Community Development Agency
224 W. Winton Avenue, Suite 110
Hayward, CA, 94544

Thank you for the opportunity to comment on the Notice of Preparation of a Program Environmental Impact Report for the Altamont Pass Wind Resource Area (APWRA) revisions to Conditional Use Permits (CUPs) for repowering and continued maintenance and operation of wind turbines in Alameda County. The Center for Biological Diversity is a national non-profit conservation organization dedicated to the protection of endangered species and wild places.

Background

The Center has been involved since 2003 in efforts to reduce avian mortality at the APWRA; we have filed previous appeals on CUPs for APWRA, filed a lawsuit against energy companies for violations of state and federal wildlife laws, and participated in the County's review and revision of permit conditions from 2004 to 2007. The Center was not a party to the ill-advised settlement agreement in 2007 that revised and relaxed CUP permit conditions.

As a conservation organization involved with efforts to reduce greenhouse gas emissions, we believe that using alternative energy sources like clean wind energy is essential to reducing our impact on the environment. However, it is undisputed that the poorly sited wind turbines at APWRA continue to kill thousands of birds each year, including more than a thousand birds of prey from 40 different species, through collisions with turbines and electrocution on power lines. Located on a major bird migratory route in an area with large concentrations of raptors — including the highest density of breeding golden eagles in the world — APWRA is the most lethal wind farm in North America for birds of prey, causing massive ongoing kills of hawks, burrowing owls, falcons, golden eagles, and other raptor species. The original permits for the thousands of wind turbines at APWRA were issued without conducting an environmental impact report, contrary to requirements under the California Environmental Quality Act (CEQA). Some Altamont energy companies continue to use antiquated turbines that are poorly placed, inefficient, and a high risk to birds. According to wind-industry reports, the controversy over bird kills at Altamont Pass has hampered wind power development in other area as unresolved concerns about impacts to birds cause other wind facilities' construction to be delayed or operations to be discontinued. The ongoing bird kills at APWRA are in violation of California and federal wildlife laws, including criminal provisions of those laws. These violations include California Fish and Game Code sections 2000, 3503.5, 3511, 3513, 3800, 12000, California Code of Regulations sections 472, 509; title 16 United States Code section 668 (the Bald Eagle and Golden Eagle Protection Act); title 16 United States Code section 703 (the Migratory Bird Treaty Act); and title 50 Code of Federal Regulations sections 10.13, 21.11, 22.11.

Wind energy can be produced without decimating wildlife populations, by reviewing siting of wind farms for bird abundance, migration, and use patterns, and designing and operating wind farms to prevent or minimize bird mortality. Existing wind facilities with adverse impacts on birds, such as the APWRA, should be required to reduce bird kills as much as possible, and mitigate fully by providing adequate compensation for any continuing impacts.

Recommendations made by the California Energy Commission to replace obsolete turbines with fewer, more efficient turbines, implement mitigation measures to reduce bird kills at existing turbines, and preserve off-site nesting habitat for raptors to compensate for ongoing unacceptable bird losses should be adopted at APWRA.

Failure to Implement Permit Conditions and Mitigation Measures

In January 2007 Alameda County reached a settlement agreement with Audubon regarding reduction of bird kills at APWRA that resulted in new permit conditions and mitigation measures. This controversial agreement scuttled existing permit conditions adopted by the Alameda County Board of Supervisors in September 2005 that conservation groups had worked three years to negotiate and implement. The key promise of the 2007 settlement agreement was a 50% reduction in kills of four focal raptor species within three years. Continued energy company violations of the settlement agreement and permit conditions have been documented since 2007, and Alameda County has attempted to subvert bird fatality reduction measures (Smallwood 2008). Mitigation recommendations made so the County's Scientific Review Committee have been grossly inadequate or have been ignored by the Altamont energy companies. Some simple mitigation recommendations made by the SRC have not been implemented, such as removing derelict towers, moving rock piles to manage rodent prey away from turbines, and removing the most lethal turbines. As the energy companies continue to miss deadlines for required mitigation measures, Alameda County simply revises the deadlines. Credible compliance monitoring with promised mitigation measures is non-existent because the County simply relies on industry reports of compliance. The energy companies have repeatedly refused to give requested data to the SRC.

Energy companies without approved repowering plans or verified compliance with SRC recommended mitigation measures should not be issued CUP permits.

Increased Raptor Mortality

The energy companies have not achieved the promised 50% reduction in raptor mortality over the three-year monitoring period. In fact, while Alameda County refuses to enforce permit conditions and promised mitigations, and energy companies refuse to implement them, raptor mortality at APWRA appears to have increased significantly recently. Bird fatality rates at APWRA appear to have increased 85% for all raptors and 51% for all birds between the periods 1998–2003 and 2005–2007 (Smallwood and Karas 2009). A monitoring report by a consultant for the energy companies (WEST et al. 2007) documented more dead raptors collected at Altamont Pass over 1.5 years than were found by California Energy Commission researchers over 4.5 years from 1998-2003 (Smallwood and Thelander 2004), when annual raptor mortality was estimated at an alarming 881 to 1,300 birds of prey. Recent reports (e.g. Smallwood et al. 2006, 2007) that wind turbines at Altamont Pass likely kill over 100 burrowing owls annually, a significant number of the burrowing owls nesting at Altamont, making the wind farm a population sink for this imperiled species.

Scope of EIR and Proposed NCCP/HCP

The NOP states that: "Concurrent with preparation of this PEIR, the County is also preparing a Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP) and joint Program Environmental Impact Statement/Environmental Impact Report (PEIS/PEIR) under the National Environmental Policy Act (NEPA) and CEQA, respectively. The United States Fish and Wildlife Service (Service) will serve as the federal lead agency under NEPA. This Notice is being issued to comply with CEQA requirements for the revised CUPs only. An additional, but separate, scoping process is anticipated to be held in fall of 2010 by the County and the Service for the HCP/NCCP PEIS/PEIR."

The PEIR is for issuance of revised CUPs for the continued operation and repowering of wind turbines at APWRA. The NOP states that another CEQA and NEPA review will occur for a planned NCCP/HCP, which apparently would revise the CUPs again, making the current EIR/EIS obsolete. How can the EIR reach significance conclusions pursuant to CEQA prior to completion of the HCP/NCCP? Is the current EIR/EIS assuming that the HCP/NCCP avoidance and minimization measures will reduce impacts to a level of less than significant? The description appears to imply that the HCP/NCCP avoidance and minimization measures will be the primary method of mitigating impacts for existing projects. Given the history of ineffective mitigation agreements in the APWRA and Alameda County's failure to enforce them or relaxing permit conditions based on false claims of compliance with CUPs (Smallwood 2008), the failure to achieve any reduction of avian fatality rates at APWRA over two decades of agreements and mitigation plans, the disturbing magnitude of the ongoing environmental impacts, and the limited suite of mitigation options the County is willing to consider, no further consideration should be given to another EIR/EIS for a NCCP/HCP.

The NOP gives the misleading impression that a mitigation strategy prepared for the NCCP/HCP would be superior to the strategy in the PEIR. The available suite of mitigation measures have been reviewed by the SRC for four years. Three of the five SRC members have been involved with fatality monitoring and research in the APWRA for periods spanning 11 to 21 years. It is highly unlikely that the committee convened to guide the NCCP/HCP -- composed mostly of individuals with little if any experience in the APWRA -- will develop a mitigation strategy that is more effective than a strategy developed by the SRC.

It is unclear whether the current EIR/EIS will analyze biological effects cumulatively or on a project by project basis. Analyzing impacts cumulatively will potentially deemphasize the effects of the existing projects due to potential benefits derived from repowering. Furthermore, combining the existing CUPs and the two repowering projects into a single 'project' for purposes of CEQA is inappropriate. There should be separate EIRs for existing CUPs and repowering, with the EIR for existing CUPs analyzing operations of existing windfarms, and the repowering EIR analyzing removal of existing windfarms and siting and impacts of new windfarms.

Project Alternatives

The EIR/EIS should also include evaluation of alternatives that a) require complete repowering of APWRA to modern wind turbines with careful siting to minimize environmental impacts; and b) close the APWRA and remove all wind turbines.

Repowering

Repowered turbines should be sited according to guidelines and criteria to minimize collision hazards to birds and bats, and to minimize grading impacts by construction of access roads and turbine laydown areas. Siting should be guided by patterns of fatality rates among APWRA wind turbines, flight patterns of species of greatest concern (golden eagle, red-tailed hawk, American kestrel, burrowing owl), and the spatial distribution of burrowing owl burrows. Siting methods have been developed by Smallwood and Neher (2009), Smallwood et al. (2009), and Smallwood and Neher (2010). Post-construction fatality and utilization monitoring should be required for at least five years, so that the effects of repowering on fatality rates and habitat displacement (avoidance effects) can be quantified to inform future permit renewals and mitigation planning.

Continued Operation of Old Turbines

The SRC has recommended removal of turbines ranked 7 to 10 on a collision hazard scale and continuation of a four-month winter shutdown. Many of the SRC recommendations over the past four years have not been met according to deadlines or not followed at all (SRC document P-147). For example, the SRC repeatedly recommended that the CUP requirements be met, as fatality reductions could not be realized without mitigation actions being taken. The SRC also recommended that all unproductive turbines and vacant towers be removed. The wind companies should better inform the SRC of their actions, including which turbines were removed or relocated, and when the actions happened. The SRC recommended compliance monitoring by a trusted third party or by the SRC. The SRC requested power output data from the companies so that the SRC could test hypotheses related to patterns of collisions, leading to improved removal and relocation recommendations. The SRC recommended a focused burrowing owl behavior study in order to learn why burrowing owls are being killed at such high rates near wind turbines. The SRC also recommended a background mortality study, searcher detection trials, more aggressive behavior monitoring of flying birds, and timely processing of bird utilization monitoring. If the continued operations of old-generation turbines are to be considered in one or more PEIR alternatives, then the SRC's recommendations should be fully implemented. All old-generation turbines that are allowed to continue operating should be monitored for fatalities until the turbines are removed.

Compensatory Mitigation

As long as horizontal-axis wind turbines operate in the APWRA, birds and bats will continue to be killed by moving turbine blades. Even if potential reduction in raptor mortality due to repowering can reach 80-85%, the remaining fatality rates will be significant. Because there is no fatality-reducing or fatality-minimizing mitigation measure that will reduce the impacts below a threshold of significance under CEQA, and impacts will continue for the life of the project, compensatory mitigation will be necessary. Compensatory mitigation payment should be required from all permittees on a per megawatt basis – this funding should go toward purchase of productive raptor habitat in the Altamont region in the form of land or conservation easements to compensate for avian mortality during permit operations.

Decommissioning and Reclamation of Existing Wind Farms

The NOP states that as repowering proceeds, power poles and electrical overhead lines will be removed, but only where they are “no longer needed.” The power poles and overhead lines kill numerous birds, although estimates of annual fatality rates caused by electrocution and line strikes have yet to be made. All power poles and overhead lines at APWRA should be removed and replaced by undergrounded lines.

Mitigation Monitoring

The EIR must include and describe in detail a credible mitigation monitoring plan. Mitigation monitoring conducted so far has been grossly inadequate (see SRC document P-148) and actions allegedly taken by energy companies are often in dispute. An effective and scientifically credible avian mortality monitoring program that is independent of the permittees is needed. Given the history of noncompliance with APWRA permit conditions, any mitigation plan for wind turbine-caused fatalities must include a performance bond to be credible.

Sincerely,

Jeff Miller
Conservation Advocate
Center for Biological Diversity
351 California Street, Suite 600
San Francisco, CA 94104
Phone: (510) 499-9185
E-mail: jmiller@biologicaldiversity.org

Citations

Smallwood, K. S., and C. Thelander. 2004. Developing methods to reduce bird mortality in the Altamont Pass Wind Resource Area. Final Report to the California Energy Commission, Public Interest Energy Research -Environmental Area, Contract No. 500-01-019, Sacramento, USA.

Smallwood, K. S. 2008. Wind power company compliance with mitigation plans in the Altamont Pass Wind Resource Area. Environmental & Energy Law Policy Journal 2(2):229-285.

Smallwood, K.S. and Karas. 2009. Avian and Bat Fatality Rates at Old-Generation and Repowered Wind Turbines in California. Journal of Wildlife Management 73(7).

Smallwood, K. S., and L. Neher. 2009. Map-Based Repowering of the Altamont Pass Wind Resource Area Based on Burrowing Owl Burrows, Raptor Flights, and Collisions with Wind Turbines. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. CEC-500-2009-065. Sacramento, California. 63 pp. http://www.energy.ca.gov/2009publications/CEC-500-2009-065/CEC-500-2009-065.PDF

Smallwood, K. S. and L. Neher. 2010. Siting Repowered Wind Turbines to Minimize Raptor Collisions at the Tres Vaqueros Wind Project, Contra Costa County, California. Draft Report to the East Bay Regional Park District, Oakland, California.

Smallwood, K. S., L. Neher, and D. A. Bell. 2009. Map-based repowering and reorganization of a wind resource area to minimize burrowing owl and other bird fatalities. Energies 2009(2):915-943. http://www.mdpi.com/1996-1073/2/4/915

WEST, Inc., University of California at Santa Cruz, Predatory Bird Research Group, BioResource Consultants Inc., Jones & Stokes. 2007. Avian Fatality Monitoring at Altamont Pass Winter 05 – Spring 07. Working Draft.

State of California – The Natural Resources Agency
DEPARTMENT OF FISH AND GAME
Bay Delta Region
7329 Silverado Trail
Napa, CA 94558
(707) 944-5500
www.dfg.ca.gov

***ARNOLD SCHWARZENEGGER**, Governor*
***John McCamman**, Director*

October 6, 2010

Ms. Sandra Rivera
Assistant Planning Director
Alameda County Community Development Agency
224 West Winton Avenue, Suite 110
Hayward, CA 94544

Dear Ms. Rivera:

Subject: Altamont Pass Wind Resource Area Conditional Use Permits, Programmatic Environmental Impact Report, SCH #2010082063, Alameda County

The Department of Fish and Game (Department) appreciates the opportunity to comment on the Notice of Preparation (NOP) of a Programmatic Environmental Impact Report (PEIR) for the Altamont Pass Wind Resource Area (APWRA) revisions to Conditional Use Permits (CUPs). Although the current CUPs will expire in 2018, preparation of the PEIR is obligated by the 2007 Settlement Agreement (Settlement Agreement) between Audubon, the wind companies, and the County of Alameda. The proposed project is intended to modify the existing CUPs to include conservation actions that are to be developed as part of the APWRA Habitat Conservation Plan/Natural Community Conservation Plan (APWRA Plan). Development of the APWRA Plan, or a similar agreement, is also obligated by the 2007 Settlement Agreement. However, if the APWRA Plan or a similar agreement is not agreed to, the PEIR may be used to modify the CUPs to be consistent with the Settlement Agreement.

In addition to the modifications of the existing CUPs, Altamont Winds LLC and NextEra Energy Resources LLC have proposed wind turbine repower projects to be included as part of the PEIR. Altamont Winds LLC has proposed the Summit Wind Project, consisting of approximately sixty 1.6-mega watt (MW) wind turbines on 7,650 acres, in the APWRA south of Interstate 580. Next Era Energy Resources LLC has proposed the NextEra Project, consisting of approximately fifty-nine 2.3 MW wind turbines on 8,900 acres, in the APWRA north and south of Interstate 580. These two projects combined would have an estimated installed capacity of 230.7 MW.

The PEIR NOP states that it is the intent of the County of Alameda to modify its CUPs consistent with the conservation strategy that is being developed as part of the APWRA Plan. The two repower projects included as part of the PEIR have a combined installed capacity that is nearly half of the 416 MW cap currently in place in the Alameda County portion of the APRWA. Under the draft Planning Agreement for the APRWRA Plan, these two projects are to be treated as interim projects.

The Department is concerned that consideration of two significant repower projects in the early stages of the APWRA Plan development may exclude viable conservation strategies and opportunities, and as a result dictate the types of conservation strategies available to the APWRA Plan. The conservation strategies developed during the APWRA Plan process are designed to guide those aspects of project design that may, or are known to, impact biological resources. Consistent with Fish and Game Code Section 2800 et seq, known as the Natural Community Conservation Planning Act, the Department may provide recommended mitigation measures or project alternatives as part of the interim project process that would help achieve the preliminary conservation objectives. In addition to considering recommendations made during the interim project process, the Department suggests the PEIR describe how these two projects will remain responsive to viable conservation strategies and not preclude or limit their development.

Ongoing or recurring biological impacts associated with the operation of current and proposed wind turbine generators (WTGs) should be analyzed. The analysis needs to include both bat and avian species that may be affected. Current methodologies base impacts and mitigation on four focal raptor species, the Golden eagle, Red-tailed hawk, American kestrel, and Burrowing owl. While these species have been used for assessing impacts on older generation WTGs, changes in design of newer WTGs may result in effects on a different suite of species. It is important that impacts to all avian and bat species be evaluated when analyzing impacts. Additionally, impacts to biological resources associated with construction of new WTGs and the remediation of old WTGs should be analyzed.

Careful siting of turbines appears to be one of the most effective ways to reduce impacts to biological resources. Based upon consultation with the Altamont Scientific Review Committee, the Department, the U.S. Fish and Wildlife Service, and the best available scientific information, the PEIR should describe high risk placements of WTGs and prohibit them.

While careful siting of turbines can help minimize anticipated levels of mortality, unknown factors may result in particular turbines being especially high risk to avian and bat species. An adaptive management and monitoring plan should be developed to assess both high risk turbines and additional methods of minimizing bird and bats mortalities. To be effective, the adaptive management and monitoring plan must have actionable items that can reasonably be expected to result in a change in mortality. The determination of thresholds to trigger management actions should not be limited to the four focal raptor species or be based solely on averages among species, as this can obscure potentially significant effects at the species level.

On January 11, 2007 the Board of Supervisors of the County of Alameda adopted Resolution R-2007-111, amending 29 CUPs and approving two additional CUPs, so as to be consistent with the terms of the Settlement Agreement. The Department would like to call attention to, and comment upon, the items identified in Condition 8 of Resolution R-2007-111, as this condition identifies content to be contained in the PEIR. In italics below are excerpts from Condition 8, followed by the Department's comment:

- *The [P]EIR will assess the environmental impacts of the repowering program (including both specific proposals and the overall repowering program set forth herein), the continued operation of existing turbine facilities, and the effectiveness of the various strategies to reduce and minimize avian mortality and other adverse impacts on wildlife (such as new turbine technology, site-specific measures, grazing management, etc.).*

  When assessing the environmental impacts, the Department recommends avoidance as the primary method of reducing impacts to biological resources. When this is no longer possible, a project should then explore the most effective methods to minimize impacts. Once avoidance and minimization measures have been exhausted the remaining impacts should be sufficiently mitigated. Additionally, mitigation for significant impacts identified in the PEIR should be mitigated consistent with the draft East Alameda County Conservation Strategy that was developed by local agencies, including Alameda County, and is supported by the Department.

- *The [P]EIR will seek to verify and validate current assumptions regarding the benefit of repowering as a means of substantially and significantly reducing the amount of avian injury and mortality resulting from most existing types of turbines, and identify appropriate means of ensuring that repowered turbines have the lowest possible rate of avian mortality.*

  The assumption regarding new technology WTGs one MW and above is that larger turbines will result in fewer mortalities. This assumption needs to be validated with peer reviewed scientific research conducted on WTGs that are similar in rotor diameter and height in order to assess future impacts from repowering.

- *The [P]EIR shall also study siting in the Altamont as a whole, and may also address how to provide incentives for an increased rate of repowering, including expanding areas where wind power facilities may be permitted.*

  Incentives for an increase rate of repowering should only be developed if it is shown that new generation WTGs reduce avian and bat fatality and mitigation measures can substantially reduce or compensate for mortalities. A proposed expansion of areas permitted for WTGs should not be contemplated until the ability to mitigate impacts from ongoing and proposed repower projects is assessed and realized. This assessment is beyond the scope of the PEIR and, as such, any expansion of WTGs should not be included.

The Department, as the Trustee Agency for fish and wildlife pursuant to the California Environmental Quality Act Section 15386, is responsible for the conservation, protection, and management of the State's biological resources. The Department acts as a Responsible Agency when a subsequent permit or other type of discretionary approval is required from the Department, such as an Incidental Take Permit (ITP), pursuant to the California Endangered Species Act, or a Lake and Streambed Alteration Agreement

(LSAA), issued under Fish and Game Code Section 1600 et seq. Based on the information we have been provided to date, activities identified in the PEIR NOP will likely require an ITP and LSAA.

The Department supports the development of renewable energy resources for projects which are in compliance with existing state and federal laws; include measures that when implemented effectively avoid and minimize impacts to native species and their habitats; include sufficient mitigation for unavoidable impacts; and provide for the conservation of biological resources. As both a Responsible Agency and Trustee Agency, the Department requests the opportunity to cooperate in the preparation of the PEIR in order to continue our close coordination with activities undertaken as part of the APWRA Plan.

If you have any questions, please contact Mr. Craig Weightman, Staff Environmental Scientist, at (707) 944-5577 or cweightman@dfg.ca.gov; or Mr. Scott Wilson, Environmental Program Manager, at (707) 944-5584.

Sincerely,

Charles Armor
Regional Manager
Bay Delta Region

cc: State Clearinghouse

Mr. Mike Thomas
U.S. Fish and Wildlife Service
2800 Cottage Way, W-2605
Sacramento, CA 95825

1934-2009
75
EAST BAY REGIONAL PARK DISTRICT

East Bay Regional Park District

2950 PERALTA OAKS COURT P.O. BOX 5381 OAKLAND CALIFORNIA 94605-0381
T. 1 888 EBPARKS F. 510 569 4319 TDD. 510 633 0460 WWW.EBPARKS.ORG

October 4, 2010

Sandra Rivera
Assistant Planning Director
Alameda County Community Development Agency
224 West Winton Avenue, Suite 110
Hayward, CA 94544

Subject: Scoping Comments for the Altamont Pass Wind Resource Area CUP Program EIR

Dear Ms. Rivera,

The East Bay Regional Park District ("District") is responding to the Notice of Preparation (NOP) for the Altamont Pass Wind Resource Area (APWRA) Conditional Use Permit (CUP) Program Environmental Impact Report (PEIR). The District owns or manages nearly 110,000 acres of open space in Alameda and Contra Costa Counties. This includes more than 3,000 acres of parklands in Contra Costa County that have wind turbine leases. Within Alameda County, wind turbines abut the northern and eastern boundaries of Brushy Regional Preserve.

The NOP describes two proposed projects; however, the enclosed figure does not show the location of the two projects. The first project, called Summit Wind Project, is located within a 7,650-acre area south of Interstate 580. This project area may include portions of the proposed Tesla Regional Preserve as shown on the District's 2008 Master Plan Map. The second project, called the NextEra Wind Repowering Project, is located in an 8,950-acre area that abuts the 1,833-acre Brushy Peak Regional Preserve.

The District's comments focus on the potential effects of these two projects on our existing and proposed regional parks and trails in the APWRA. These include potential effects to biological and cultural resources, water quality, visual environment, public access, and emergency and maintenance access. Please see our attached detailed scoping comments.

Please call me at (510) 544-2622 should you have any questions regarding our letter.

Sincerely,

Brad Olson
Environmental Programs Manager

RECEIVED OCT 05 2010

East Bay Regional Park District
Scoping Comments

Altamont Pass Wind Resource Area
Conditional Use Permit
Program Environmental Impact Report
October 4, 2010

1. Project Background Information

The proposed project is located adjacent to Brushy Peak Regional Preserve in north eastern Alameda Costa County. The 1,833-acre Preserve has substantial natural, cultural and scenic resources of regional significance. Wind turbines abut the northern and eastern boundaries of the Preserve.

Some of the existing turbines have been in operation for more than twenty years. When these initial facilities were installed, little was known about the potential effects of these facilities on wildlife, plants, special-status species, water quality, esthetics and recreation. Since that time there have been a number of significant changes in project circumstances that must be addressed in the PEIR. One area of particular significance is project impacts to raptors, such as golden eagles, and to special-status species. In the past fifteen years, the Alameda whipsnake, California red-legged frog, California tiger salamander and fairy shrimp species have been listed as threatened or endangered under the California and/or federal endangered species acts.

Golden eagles, Prairie falcon, Western burrowing owl, red-legged frog, tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp and San Joaquin spear scale are present at the Preserve. The endangered San Joaquin kit fox was observed at the Preserve in 2004. The Preserve is very rich in special-status species that may be affected by the proposed project. The District has been conducting restoration projects, habitat management improvements and wildlife monitoring at the Preserve for several years. This includes rehabilitation of ponds, construction of wetlands, non-native species control and range management improvements.

2. Existing Biological Resource Impacts

Wind turbine operations in the APWRA cause on-going avian and bat fatalities (Smallwood 2010 SRC-P145, Smallwood 2007, Smallwood and Thelander 2008, Smallwood and Karas 2009). Depending on species and study, fatality estimates vary. A mitigation plan adopted on Sept. 22, 2005 by the Alameda County Board of Supervisors and amended according to a Settlement Agreement between the County of Alameda, Audubon and wind companies identified four focal species of raptors for measuring fatality rates to gauge the success of mitigation measures, particularly a targeted 50% reduction in focal species fatality. The 50% reduction in fatalities has not been achieved.

One study estimated for the period 2005-2009 that the APWRA killed per year on average 55 golden eagles, 253.4 red-tailed hawks, 475.4 American kestrels and 713.9 burrowing owls (Smallwood 2010 SRC-P145). The same study estimated yearly fatality rates of 1,644.6 for all raptors, 7,643.1 for all birds, and 83.9 for all bats. These fatality estimates are similar to those produced in other studies for earlier time periods (Smallwood and Karas 2009). Recent work that takes into account improved estimates of scavenger bias in fatality monitoring studies suggest that existing fatality rates in the APWRA may be even higher, e.g. 3 times higher for red-tailed hawks, 68% higher for all raptors combined, and 67% higher for all birds combined (Smallwood et al. 2010). The most recent estimate for annual numbers of golden eagles killed in the APWRA is 94.0 (80% CI: 66.5 – 121.5) per year (Smallwood 2010 SRC-P145). The fatality rate for golden eagles remains high enough to conclude that the existing conditions of the APWRA represent a population sink for the local breeding population of golden eagles (Hunt 2002, Hunt and Hunt 2006). The same may hold for burrowing owls (Smallwood et al. 2007), prairie falcons (Bell, unpublished data) and other species.

Given that it is unlikely the Altamont will be repowered rapidly and uniformly across all wind farms in the Altamont, we can expect continued high raptor, bat and other bird fatality rates for the foreseeable future. It is important that the mitigation measures recommended by the Altamont Scientific Review Committee (SRC) to reduce mortality rates in the existing infrastructure of the APWRA be implemented rapidly and completely. Unfortunately implementation of mitigation measures required by the existing CUPs and the Settlement Agreement has been slow, piece-meal and in some cases non-existent (Smallwood 2008, Smallwood 2010 SRC-P147, Smallwood 2010 SRC-P148). Revised CUPs for continued maintenance and operation of existing wind turbines need to include the existing fatality monitoring and mitigation requirements in order to reduce avian and bat fatality rates. For example, two of the most effective mitigation measures put forth by the SRC to reduce raptor mortality in the existing wind farms are the winter shutdown period and the relocation of hazardous turbines to less dangerous areas. These measures should remain in place for the operational life of the old generation wind turbines until they are removed.

Assurances for mitigation compliance and enforcement, along with consistent reporting and fatality monitoring, need to be codified in the revised CUPs. The best format to achieve this would be to maintain the current SRC as a condition of the revised CUPs so that the recommendations of the SRC are followed during mitigation implementation.

To best gauge the effectiveness of mitigation measures both for the existing conditions as well as for the repowering of the APWRA, the CUPs should be revised to reflect the Attorney General's concerns in a letter dated March 1, 2007, to the Alameda County Planning Director regarding the use of incorrect baseline bird mortality figures and correction factors in both the settlement agreement and the amended CUPs. The revised CUPs should provide new baseline avian fatality rate estimates, as well as the stipulation that the estimates may be changed through time to reflect the best available science. This will provide the most up to date and accurate baseline data for comparison of impacts with a repowered Altamont. This in turn will facilitate adaptive management of the APWRA to lower avian and bat fatality rates.

3. Project-Related Biological Resource Impacts

In March of 2009 the California Energy Commission (CEC) released a Public Interest Energy Research Final Project Report entitled "Range Management Practices to Reduce Wind Turbine

Impacts on Burrowing Owls and Other Raptors in the Altamont Pass Wind Resource Area, California." The report is available on the CEC website. It contains substantial information about the effects of wind turbines on raptors in the Altamont Pass Wind Resource Area (APWRA). This information should be considered in the PEIR.

Contra Costa County Public Works Department has been conducting monitoring of wildlife impacts along a portion of Vasco Road, just east of Vasco Caves Regional Preserve. A March 30, 2009, report entitled "Vasco Road Wildlife Movement Study Report" documents a substantial mortality of wildlife along just a 2.5 mile stretch of Vasco Road adjacent to the Preserve. Approximately 1,339 individuals, including 50 California tiger salamander and 120 red-legged frogs, were killed on Vasco Road in a fifteen month period. This report should be considered when evaluating the construction of roads for the project and in evaluating the cumulative effects of roads to wildlife in the region. Several additional reference documents are identified at the end of these comments. These documents should be considered in preparing the PEIR.

Operation of the APWRA represents a population sink for the local breeding population of golden eagles (Hunt 2002, Hunt and Hunt 2006), and likely for Western burrowing owls (Smallwood et al. 2007) and prairie falcons (Bell, unpublished data). The PEIR should address the impacts to regional populations of these species. Careful review of fatality reports for the APWRA should be conducted to identify and include other species that may be suffering population-sink conditions in the APWRA. Monitoring of local populations at an appropriate scale should be required as a mitigation measure. For example, the US Fish and Wildlife Service recommends monitoring all golden eagle territories within 10 miles of a given wind farm project (Pagel et al. 2010) to ascertain population impacts through time.

Many species nest within the APWRA. The effect of large turbines and infrastructure in close proximity to nests should be evaluated along with mitigating buffers. This is especially critical for raptors such as golden eagle, Western burrowing owl, red-tailed hawk, Swainson's hawk and prairie falcon. New guidelines produced by the US Fish & Wildlife Service (Pagel et al. 2010) for monitoring golden eagles in relation to new wind farm construction should be followed, as the repowering of the APWRA represents replacing old infrastructure with an entirely new set of infrastructure.

The Beechy ground squirrel is a major raptor prey species; it is also a keystone species for grasslands and is found throughout the APWRA. Efforts by landowners to control this species involve poisoning which often results in secondary poisoning of raptors and other predators. Ground squirrel control via poisoning within the APWRA should cease as a mitigation measure. The PEIR should explore ways to compensate ranchers for economic loss due to ground squirrels if they cease control measures. It should also evaluate ways to encourage landowners in areas that do not have wind turbines and have eliminated ground squirrels through past control efforts to promote ground squirrels. This would provide foraging habitat that may encourage raptor foraging in turbine free areas. The PEIR should evaluate other measures to discourage prey populations away from turbine strings, such as targeted vegetation management (Smallwood et al. 2009).

The PEIR should consider the extensive information on impacts and mitigation recommendations developed by the Alameda County SRC and in other relevant documents.

- What has the monitoring data for repowered turbines shown about avian mortality rates? Has overall mortality been reduced? Are the actual numbers consistent with the projected numbers?

- How are the individual species affected by the repowering project? In particular, how are golden eagles, burrowing owls and bats affected?

- How will the County use the monitoring, operation, citing and design information from other relevant projects to determine the potential effects and mitigate the impacts resulting from the proposed project? Repowering using GIS based risk maps of fatalities and flight behavior should be considered in the PEIR.

- Golden eagles are being killed at a rate that may well exceed sustainable levels in the region. If such mortality rates continue, might the individual or cumulative impacts to this species result in localized extinction of the species? How would the project mitigate for its cumulative contribution to this impact?

- How will the operation of fewer larger turbines affect the various birds and bats that use habitats in the project area? The repowered turbines "sweep" a larger diameter of air as it passes over the Altamont Hills. The blades on new turbines move at a different speed than existing turbines. How will these changes affect different species? For example, we understand that the new larger turbines are killing more bats than the existing turbines.

It appears that repowered turbines on the order of 1.0 MW or larger are causing increased bat fatalities in the APWRA relative to pre-repowered conditions (see Insignia Environmental 2009). Given this, a long term fatality monitoring program should be established that incorporates both bats and birds, and the impacts to bats species specifically should be assessed and measured as each repowering project comes on line. The development and implementation of mitigation measures for bats will likely depend on information that is yet to be collected, so flexible mitigation measures based on adaptive management and conditional targets will be required.

The proposed project calls for installation new larger turbines to replace the existing turbines in the project area. This will require removing turbines, foundations, pads and supporting utility connections. The EIR should examine the potential effects of removing the old facilities on numerous terrestrial wildlife species, including American badger, San Joaquin kit fox, ground squirrels, California tiger salamander and red-legged frog. These terrestrial species, along with the ground-nesting Western burrowing owl, make use of the habitats created by the original turbine projects. For example, the areas around existing turbine foundations can be riddled with ground squirrel burrows. These burrows may also be used by badger, kit fox, coyote, tiger salamander, red-legged frog and burrowing owl. Biological surveys should be conducted within the disturbed areas to determine how best to restore natural habitats with minimal impacts to wildlife.

The EIR should also consider the impacts of constructing new roads and wind energy facilities in the project area. Construction of new roads, staging areas, pads, foundations, underground utilities, above ground utilities and turbines will all result in potentially significant impacts to terrestrial species. Excavation and grading may affect all of the above described species. Preconstruction surveys must be conducted to determine the extent and location of potentially affected terrestrial species. Measures must be implemented to avoid potential impacts and potentially impacted terrestrial animals should be relocated away from the project impact area. In some cases, such as for breeding burrowing owls, it would be necessary to wait until chicks have fledged before burrows could be destroyed. Buffers should also be established around active nests for eagles, falcons and other raptors.

The applicants should also establish procedures for securing the site during project construction to reduce the potential for impacts to biological resources. This would include new fencing, restrictive signage, setting and enforcing speed limits, and closure of certain roads to prevent contractors from unnecessarily entering areas where there may be sensitive resources, and other measures to protect the sensitive natural and cultural resources at the Preserve.

The PEIR should consider the cumulative effects of multiple repowering projects within the entire AWPRA, including the proposed Vasco Winds and Tres Vaqueros repowering projects in Contra Costa County. This analysis should consider both terrestrial and avian impacts during project construction, operation and maintenance activities.

On-going fatality monitoring should continue to place repowering and its mitigation in an adaptive framework.

The Preserve has a very rich assemblage of ecological communities, including perennial grassland, annual grassland, rock outcrop, sandstone basins, stock ponds, alkali seeps and meadows, perennial freshwater marsh, riparian scrub, and oak-buckeye woodland. All of these communities may be present in the project area. The DEIR needs to address potential impacts to each of these community types and to the special-status plants and animals that they contain.

As previously described, the District has also made a number of changes in the Preserve, including restoration of ecological communities and range management practices to improve wildlife habitat values. The District will continue to monitor these improvements and make adaptive management changes when necessary. Similar monitoring and management changes should also be implemented throughout the project area to reduce on-going impacts and to minimize the effects of repowering projects.

The PEIR should identify mitigation opportunities on two levels: the community level and the species level. Mitigating loss of highly impacted ecological communities, such as grasslands, would benefit guilds of species such as grassland song birds, California tiger salamanders, California red-legged frog, American badger, etc. Mitigating impacts to individual species, such as golden eagle, will require species-specific mitigations that may involve a host of options, such as purchase of specific nesting habitat, purchase or enhancement of range and foraging habitat, and extending monitoring beyond the APWRA to encompass population-specific appropriate geographic scales.

A mitigation alternative should be explored: the phased shut down of existing wind farms based on time-to-repowering. For example, the Tres Vaqueros Wind Project, Contra Costa County, permanently shut-down its wind turbines about five months before a Notice of Preparation for the repowering of the wind farm was issued. By the time the EIR for this project will have been approved and construction is initiated, several years of turbine-blade caused avian and bat fatalities will have been avoided, such as an estimated 0.5 golden eagles, >12 red-tailed hawks, 9 American kestrels and 51 burrowing owls (Smallwood 2010 SRC-P178) that would have otherwise been killed per year.

Although repowering of wind farms with fewer, larger wind turbines appears promising (Smallwood and Karas 2009), it does not eliminate avian or bat kills and may even be as bad or worse for some species. Preliminary evidence from monitoring the recently repowered Buena Vista Wind Farm (1.0 MW turbines) in Contra Costa County suggests that fatality rates for golden eagles remain high and bat fatalities may exceed pre-repowering rates (Insignia Environmental 2009, Smallwood 2010 SRC-P178). Projecting the Buena Vista raptor fatality rates to the 25 MW proposed for the repowering of Tres Vaqueros Wind Project yields predicted mean annual fatalities of 3.5 golden eagles, 8.5 red-tailed hawks and 6.7 American kestrels for the eventual repowered wind farm (Smallwood 2010 SRC-P178). It is therefore critical that the revised CUPs contain adaptive management language, modeled on existing SRC recommendations, to accommodate new information on the changing suite of avian and bat impacts in repowered wind farms, and to provide for language that includes relocating problematic infrastructure, if necessary.

The extent to which fatality rates may be reduced through repowering a wind farm depends on the species, site-specific topography of the wind farm, turbine size (rotor diameter, tower height) and location. Species-specific raptor flight behavior and land use patterns combined with fatality data are being used in conjunction with digital elevation mapping to create risk maps that identify potentially deadly sites for turbine locations in terms of risk of raptor/turbine blade strikes (Smallwood and Neher 2009, Smallwood et al. 2009a, Smallwood et al. 2009b). Such risk maps have been produced for a suite of species. The maps can be used to recommend and inform turbine siting plans both at the micro-siting level, eg. moving a turbine 5-10 m to reduce strike risk, and overall site evaluation, e.g. identifying sites that pose unacceptable risks and therefore need to be eliminated from turbine siting plans. This process of applying raptor-flight risk maps to site wind turbines is already being used in the development of the Tres Vaqueros Wind Project, Contra Costa County (Smallwood 2010 SRC-P162). Careful repowering should be a requirement of the revised CUPs for the APWRA to reduce the risk of raptor fatalities in the repowered wind farms.

Even with careful repowering, continued avian and bat fatalities are to be expected. Therefore, continued fatality monitoring should be a requirement for the life of the CUP in order to gauge the success of overall repowering as a mitigation tool and to measure whether a 50% reduction in the focal raptor species has been achieved. Continued and regular input by the SRC should be required to provide the necessary scientific oversight to gauge mitigation compliance and results.

Most of the impact from construction of the original wind turbine projects has gone unmitigated. Mitigation for wind turbine operational impacts has largely been experimental. Repowering of existing wind turbines presents an opportunity to fully mitigate the individual and cumulative effects of wind turbines in the project area.

The PEIR should identify mitigation opportunities and requirements, including development of the proposed HCP/NCCP, land preservation through conservation easement or fee title, collection of repowering fees, large-scale ecological restoration projects, removal of barriers to migration of terrestrial wildlife, protection of wildlife migration corridors, acquisition and retirement of wind rights on certain high resource value properties and selected removal of specific wind turbines that have high mortality rates.

Mitigation should focus first on measures to avoid, minimize and reduce impacts through time. On-site mitigation should be given priority over off-site mitigation, except when significant opportunities occur to remove migratory barriers or preserve unprotected migratory corridors.

Acquisition of mitigation land should not be based upon price; it should be based acquiring specific properties with high ecological values that most effectively meet overall mitigation goals and priorities.

The PEIR should provide for an oversight body that can review monitoring data and make recommendations on additional measures that may be implemented to further reduce on-going impacts from wind turbine operations and maintenance.

4. Water Quality

The proposed project should remove unneeded roads and associated drainage facilities. Some of the roads are in poor condition; some are highly erosive, causing substantial downslope sedimentation in wetlands and riparian areas, impacting the species that depend upon these habitats, including tiger salamander, red-legged frog and fairy shrimp.

Abandoned roads should be recontoured and restored with native perennial grasses. The restoration will need maintenance and monitoring for several years until successfully established. The applicants should be required to create an endowment, a management and monitoring plan, establish specific restoration objectives, conduct proposed improvements, and provided for long-term maintenance and monitoring of restored areas.

Temporary roads, potentially as wide as 40-feet may be necessary to construct the proposed project. Typical roads in the project area are 12 to 15 feet in width and appear adequate for the maintenance of existing wind turbines. To the extent feasible, the applicants should use existing roads and utilize helicopters and cranes in order to reduce the amount of road grading necessary for construction of the proposed project.

Aerial construction methods are frequently employed by PG&E and other utilities to construct large electrical transmission towers in remote areas that are inaccessible from roads or where there are sensitive ecological habitats that cannot be disturbed. A recent example occurred in the Gateway Valley of Orinda where PG&E relocated about one mile of 500 KV electrical towers. PG&E used a monopole tower that was assembled in sections using helicopters. This method eliminated the need for construction of roads in some areas. This may be applicable to the proposed projects.

New access roads should be designed to minimize the potential for slope failure and erosion. Drainage should be contained and discharged in a manner that does not concentrate flows that scour hillsides or deposit sediments and other pollutants into wetlands and drainages. A portion of the project area drains into the Preserve.

Consideration should be given to the potential release of hazardous materials from demolition of existing turbines and construction of new facilities.

Maintenance of the proposed project also has the potential to release hazardous materials into the environment. This would include concrete, fuels, oils, solvents and paints. Of particular concern are hazardous materials that might be discharged into wetlands and drainages in the project area.

5. <u>Cultural Resources</u>

The Preserve has tremendous and regionally significant cultural resources from a long habitation by Native Americans. There are many artifacts from this history throughout the Preserve. As a result, the northern portion of the Preserve is closed to general public access and there is ongoing monitoring and police enforcement to protect these sensitive cultural artifacts. It is very likely that similar cultural artifacts may be encountered in the project area. This could include surface artifacts and burials that could be disturbed or destroyed during project construction.

There should be a thorough investigation of the project area to locate, document, avoid and protect cultural resources that may be affected by the proposed projects. A specific mitigation and monitoring plan should be developed that provides for construction monitoring (by a qualified archeologist) throughout the construction period. The project mitigation measures should also include contingencies should something be encountered during project construction. Information about the specific cultural resources of the area must be kept confidential and provided only on a need to know basis. Employees should be trained on procedures for identifying and protecting cultural artifacts that may be encountered during project construction.

The applicant should also establish procedures for securing the site during project construction to reduce the potential for vandalism and theft of cultural artifacts. This would include site security and closure of certain roads to prevent contractors from unnecessarily entering areas where there may be cultural artifacts.

6. <u>Maintenance and Operations</u>

The DEIR should identify mitigation measures to be implemented (within the project area) to provide improved site security, including new gates that open and close properly, new fencing where needed, regular inspections by the site supervisor and employee training about the sensitive cultural resources in the area.

6. <u>Visual Impacts and Aesthetics</u>

The visual environmental at the Preserve includes a number of existing wind turbines to the east and north. Removal and replacement of old turbines with substantially larger new turbines may result in new or substantially increased visual impacts to the Preserve. Mitigation for such impacts may be elimination or relocation of turbines away from Preserve boundaries where turbines may be less visually intrusive.

The EIR needs to consider the individual and cumulative visual impacts of the proposed turbines in conjunction with other repowering projects in the area. We request that visual impact simulations be conducted from within the Preserve looking towards the new repowered turbines. The District is available to meet with County staff and/or project applicants to identify the most visually sensitive areas within the Preserve where visual impact analyses should be conducted.

The EIR should also address the cumulative visual effects of the three Contra Costa County repowering projects (i.e. Buena Vista, Tres Vaqueros and Vasco Winds).

There has been much discussion in the past about the colors and patterns that have been applied to the wind turbines. While making the turbines blades more visible for birds may be an overriding consideration, perhaps other improvements to the turbine towers and bases would reduce the overall visual impacts. For example, are there other colors or patterns that might make visually prominent turbine towers less visible from the Preserve?

Consideration should also be given to reducing the visual prominence of existing and proposed support facilities, such as maintenance yards, buildings, substations, transformers, etc. Are there surface treatments or screens that could be employed to reduce the visibility of these structures from the Preserve? Relocating and/or covering the surplus turbine parts would make them less visually prominent.

The hillsides in the project area near the Preserve have contained substantial amounts of debris from the past 25 years of wind energy generation, including derelict turbines, obsolete anemometers, unused electrical poles, broken turbine blades and abandoned roads. The proposed project provides the opportunity for the better management of these facilities. Regular inspection and enforcement of mitigation measures and conditions of approval by the County would improve the aesthetics of the areas surrounding the Preserve.

7. Emergency, Maintenance and Public Access

Laughlin Road is the only public access road to the Preserve. This road should remain accessible at all times for the public. Secondary access points from Dyer and Vasco Roads provide for District emergency and maintenance vehicles to reach the Preserve. These secondary access points must remain accessible during project construction.

The District may develop the planned "Morgan Territory to Brushy Peak Regional Trail" through the western edge of the project area. We are concerned about the potential public access restrictions that may be imposed in order to protect public safety from the repowered turbines. For example, the EIR should establish reasonable set-back requirements between turbines and roads that might be useable as future trails. The planned trail is shown on the District 2007 Master Plan map.

8. Project References

The following documents and references should be considered in preparing the PEIR.

Hunt, W. G. 2002. Golden eagles in a perilous landscape: Predicting the effects of mitigation for wind turbine blade-strike mortality. P500-02-043F. Consultant Report to California Energy Commission, Sacramento, California.

Hunt, G. and T. Hunt. 2006. The Trend of Golden Eagle Territory Occupancy in the Vicinity of the Altamont Pass Wind Resource Area: 2005 Survey. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2006-056.

Insignia Environmental. 2009. 2008/2009 Annual Report for the Buena Vista Avian and Bat Fatality Monitoring Project. Unpublished report prepared for County of Contra Costa, Martinez, California.

Pagel, J. E., D. M. Whittington and G. T. Allen. 2010. Interim Golden Eagle technical guidance: inventory and monitoring protocols; and other recommendations in support of eagle management and permit issuance. Division of Migratory Bird Management, U.S. Fish and Wildlife Service.

Smallwood, K.S. 2007. Estimating wind turbine-caused bird mortality. Journal of Wildlife Management 71:2781-2791.

Smallwood, K.S. 2008. Wind power company compliance with mitigation plans in the Altamont Pass Wind Resource Area. Environmental & Energy Law Policy Journal 2:229-285.

Smallwood, K.S. 2010 SRC-P145. Fatality rates in the Altamont Pass Wind Resource Area 1998-2009. Altamont Scientific Review Committee Report P145 (www.altamontsrc.org/alt_doc/p145).

Smallwood, K.S. 2010 SRC-P147. Summary of Alameda County SRC Recommendations and concerns and subsequent actions. Altamont Scientific Review Committee Report P147 (www.altamontsrc.org/alt_doc/p147).

Smallwood, K.S. 2010 SRC-P148. Progress of Avian Wildlife Protection Program & Schedule. Altamont Scientific Review Committee Report P148 (www.altamontsrc.org/alt_doc/p1478).

Smallwood, K.S. 2010 SRC-P178. Baseline Avian and Bat Fatality Rates at the Tres Vaqueros Wind Project, Contra Costa County, California: Report to the East Bay Regional Park District. Altamont Scientific Review Committee Report P178 (www.altamontsrc.org/alt_doc/p178).

Smallwood, K. S. and B. Karas. 2009. Avian and Bat Fatality Rates at Old-Generation and Repowered Wind Turbines in California. Journal of Wildlife Management 73:1062-1071.

Smallwood, K. S., and L. Neher. 2009. Map-Based Repowering of the Altamont Pass Wind Resource Area Based on Burrowing Owl Burrows, Raptor Flights, and Collisions with Wind Turbines. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. CEC-500-2009-065. Sacramento, California. 63 pp. http://www.energy.ca.gov/2009publications/CEC-500-2009-065/CEC-500-2009- 065.PDF

Smallwood, K.S. and L. Neher. 2010. SRC-P162. Siting repowered wind turbines to minimize raptor collisions at Tres Vaqueros Wind Project, Contra Costa County, California: Draft Report to the east Bay Regional Park District. Altamont Scientific Review Committee Report P162 (www.altamontsrc.org/alt_doc/p162).

Smallwood, K. S., C. G. Thelander. 2008. Bird Mortality in the Altamont Pass Wind Resource Area, California. Journal of Wildlife Management 72:215-223.

Smallwood, K. S., C. G. Thelander, M. L. Morrison and L. M Rugge. 2007. Burrowing owl mortality in the Altamont Pass Wind Resource Area. Journal of Wildlife Management 71:1513-1524.

Smallwood, K. S., L. Neher, and D. A. Bell. 2009a. Map-based repowering and reorganization of a wind resource area to minimize burrowing owl and other bird fatalities. Energies 2009(2):915-943. http://www.mdpi.com/1996-1073/2/4/915

Smallwood, K. S., L. Rugge, and M. L. Morrison. 2009b. Influence of Behavior on Bird Mortality in Wind Energy Developments: The Altamont Pass Wind Resource Area, California. Journal of Wildlife Management 73:1082-1098.

Smallwood, K. S., D. Bell, S. A. Snyder and J. DiDonato. 2010. Novel scavenger removal trials increase estimates of wind turbine-caused avian fatality rates. Journal of Wildlife Management 74:1089-1097.

Smallwood, K. S., L. Neher, D. Bell, J. DiDonato, B. Karas, S. Snyder, and S. Lopez. 2009c. Range Management Practices to Reduce Wind Turbine Impacts on Burrowing Owls and Other Raptors in the Altamont Pass Wind Resource Area, California. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. CEC-500-2008-080. Sacramento, California. 183 pp. http://www.energy.ca.gov/2008publications/CEC-500-2008-080/CEC-500-2008-080.PDF

Smallwood, K.S. 2010 SRC-P145 Fatality rates in the Altamont Pass Wind Resource Area 1998-2009. Altamont Scientific Review Committee Report P145 (www.altamontsrc.org/alt_doc/p145)

save MOUNT DIABLO

Mailing Address
1901 Olympic Blvd., # 220
Walnut Creek, CA 94596
Tel: (925) 947-3535
Fax: (925) 947-0642

Website
www.savemountdiablo.org

October 8, 2010

Sandra Rivera, Assistant Planning Director
Alameda County Community Development Agency
224 W. Winton Avenue, Suite 110
Hayward, CA 94544

Re: Altamont Pass Wind Resource Area CUP PEIR

Dear Ms. Rivera,

Altamont Pass is an area of special interest to Save Mount Diablo (SMD) because it offers a variety of aesthetic, biotic, and recreational resources, so we are concerned with any project proposed which may have impacts on this site. As part of that, we have been paying close attention to the planning process for the proposed Altamont Pass Wind Resource Area Habitat Conservation Plan/Natural Community Conservation Plan (APWRA HCP/NCCP) to understand how it may enhance or degrade the resources found there.

We appreciate that you have provided SMD notification about the proposed project and submit the following comments for consideration.

Save Mount Diablo's Position

Save Mount Diablo does not yet have a position on the proposed revisions to the Conditional Use Permits for repowering, maintenance, and operation of wind turbines in the APWRA. Nor do we currently have a position on the proposed Summit Wind Project or NextEra Wind Repowering Project. However, Save Mount Diablo has a number of concerns about the proposed turbine projects and believe they have the potential to have significant impacts on a number of sensitive resources in the area.

Project Description

The Notice of Preparation describes the project as having three distinct components: an update to existing Conditional Use Permits and two repowering projects that would replace existing wind turbines and related infrastructure.

The project proposes to update the Conditional Use Permits to make them consistent with the conservation strategy in the APWRA HCP/NCCP. Save Mount Diablo has no comment on the amendments to the CUPs for the NOP. We look forward to reviewing the information in the environmental impact report related to the CUPs.

In addition to the amendments to the CUPs, the NOP includes two repowering projects that cumulatively propose to install 119 new turbines to replace existing, aging turbines and their associated infrastructure. The first of these, the Summit Wind Project, proposes to construct 60 new 262-foot tall turbines. These new turbines would be served by associated

RECEIVED OCT 1 3 2010

infrastructure including foundations, access roads, electricity collection systems, and maintenance facilities. The NOP states that the applicant, Altamont Winds LLC, would construct these new turbines to replace existing, aging wind turbines and equipment. Existing turbines and equipment would be removed and the area returned to its natural state. However, the NOP does not provide the number of turbines nor the amount of associated infrastructure that will be removed as part of the project.

The second repowering project, known as the NextEra Repowering Project, would remove existing turbines and install 59 new 428-foot turbines, each with infrastructure similar to what is included in the Summit Wind Project. Again, the NOP does not specify the number of turbines that will be removed from the NextEra site as part of the repowering project. The NOP states that most roads will be decommissioned, except those needed to provide maintenance access to the new turbines, but leaves unclear how much land would be restored.

Combined, the Summit Wind Project and NextEra Repowering Project would install 119 new turbines ranging from approximately 262 feet and 428 feet in height. These new turbines will require a substantial amount of associated infrastructure that will potentially have significant impacts on a number of sensitive resources. Without knowing the number of turbines and amount of associated infrastructure that will be removed from the area, it is impossible to assess the level of significance of the cumulative impacts of these two repowering projects.

The environmental impact report should specifically list how many turbines and what accessory infrastructure will be removed as part of the repowering projects. Additionally, the EIR should include maps that show (a) the location of existing turbines and related infrastructure; (b) the turbines and related infrastructure that will be removed; and (c) the turbines and infrastructure that would be installed by the project. Furthermore, the EIR should specify the total number of acres that will be disturbed by the turbines and related infrastructure, including both permanently and temporarily during construction.

The NOP does not identify where in the APWRA the repowering projects would be located. It is difficult for the public to assess what impacts these repowering projects could potentially have on sensitive resources if we don't know the areas that will be impacted. The EIR should include maps that show the exact location of the repowering projects within the APWRA.

Potential Impacts for Consideration

The proposed repowering projects will potentially impact a number of sensitive resources in the Altamont area. Save Mount Diablo believes that the environmental impact report should consider the following:

Biological Resources

1) Avian Wildlife - Avian mortality is an issue of particular concern in Eastern Alameda County because of the large number of turbines in the area. These turbines have significant impacts on birds and bats in the area which collide with the turbines while soaring on wind currents and foraging for prey in the area's open grasslands.

The NOP does not state the exact number of turbines that will be removed as part of the repowering projects. Therefore, the public does not know whether there will be a net increase or decrease in the number of turbines in the area. If the repowering project results in a larger number of turbines in the area, how will this impact avian mortality?

How would the new turbines proposed for installation compare to the size of the existing turbines that will be removed? If they are larger, how would the addition of larger, taller wind turbines to the area affect avian mortality? Are there any studies which show that the larger turbines result in either an increase or decrease in avian mortality?

Different avian species fly at different heights. Constructing taller wind turbines would likely result in impacts to a different set of species than those that are currently impacted by the existing turbines. For example, many bat species fly at an altitude higher than the existing turbines. Would the addition of taller wind turbines have impacts on any special status bat species that fly at higher elevations?

2) Terrestrial Wildlife – The Summit Wind Project and the NextEra Wind Repowering Project include a substantial amount of infrastructure removal and construction which would have significant impacts on a number of special status terrestrial species.

The EIR should analyze how the construction of 119 new wind turbines, new roads and other related new infrastructure will impacts the habitat and movement of San Joaquin kit fox, the American badger, California red-legged frog, California tiger salamander, Western burrowing owl, among other species.

a) Roads and Other Related Infrastructure – The Notice of Preparation indicates that new and improved roads as well as new pads, foundations, a new electrical collection system, meteorological towers, maintenance house facilities, and offices and a control center will be built in association with the repowering project.

   It seems likely that a significant amount of soil will be graded for the construction of the access roads and other infrastructure. The EIR should include figures indicating the amount of soil which will be graded to complete new construction.

   How would the grading of such a large amount of soil impact ground squirrel burrows which provide habitat for the San Joaquin kit fix, the Western burrowing owl, the California red-legged frog, the California tiger salamander, and other wildlife?

   Based on the map included with the NOP, it appears the APWRA includes several streams and drainages with wetlands characteristics. The area appears to be used for cattle grazing and, as a result, there are a number of ponds in the area that also provide wetland habitat for special status species. Intense grazing can cause a significant increase in soil erosion in the area. Potential erosion of soil near wetlands would have impacts on wetland-dependent species. The grading associated with new roads and other infrastructure could impact streams and wetlands in the area. Additional roads and infrastructure will also increase the amount of impermeable surface, which has the potential to increase the amount and speed runoff, which, in turn, impact creeks. The EIR should include a map showing the exact location of all of the grading proposed for new roads and infrastructure in relation to the streams, drainages and other wetlands on the property.

   A wetland delineation should be provided for the project site in order to properly evaluate the impacts of the project. The EIR should also assess the potential impacts of the project on the riparian habitat on the property.

b) Removal and Construction of Wind Turbines – The construction of 119 new wind turbines would require additional grading and excavating which would also potentially impact burrows and wetlands used as habitat by special-status species. Furthermore, the removal of the existing wind turbines and the installation of new ones would substantially increase the amount of traffic accessing the property and travelling across the site. Each additional vehicle driving on the project site poses a threat to special status species moving through the area.

   The EIR should address the impact of increased use of the roads within the project area, particularly with respect to wildlife habitat and movement.

   The Notice of Preparation states that existing turbines and related facilities will be removed and the areas will be re-contoured. The document does not, however, specifically state how many existing turbines will be removed and whether all of the un-used turbines and related facilities will be removed. In addition, although they would no longer be in use, existing roads and other infrastructure may impact wildlife and their habitat. For example, roads contribute to run off and affect water quality and habitat of streams and wetlands. These potential impacts from the project should be evaluated in the EIR.

The EIR should include as mitigation the identification and removal all of the existing facilities and infrastructure on the project site that will no longer be in use.

3) Rare Plant Species – The EIR should include an analysis of project impacts to all rare plants that may potentially occur in the area.

The grading and construction of new turbines and related roads and infrastructure, as well as the removal of turbines, could potentially have significant impacts on a number of rare plant species. Increased activity related to construction increases the likelihood of an accidental wildfire that could impact rare plants. Construction vehicles and machinery that are used at other sites could bring in seeds from non-native invasive plants to the project area that would out-compete native rare plants.

Aesthetic Resources

The Notice of Preparation states that the largest of the new turbines would be approximately 428 feet above ground level. However, the document does not indicate how much taller the proposed turbines would be than the existing turbines. The EIR should include these height differences. Furthermore, the EIR should include a description of the location of the new turbines related to topography. If the new turbines are located at higher elevations than the existing turbines, they would likely be more visible than if they were located on lower elevation.

Save Mount Diablo is concerned that the taller turbines may be more visible from greater distances and over ridge tops that hide the turbines present at the project site. The project area is currently characterized by rolling grasslands with high hills and ridgelines rising up above canyons and valleys. The EIR should evaluate whether the height of the proposed turbines make the wind farm visible above some of the surrounding ridges and increase visibility from greater distances. The project site is also located in close proximity to a number of preserved open spaces used for recreational purposes. Brushy Peak Regional Preserve is directly adjacent to, and nearly surrounded by, the APWRA. The NOP does not state specifically where in the APWRA the repowering projects will be located. The project's impacts to the visual character of the area should be considered from a number of trails and view points within Brushy Peak and from other important viewshed locations.

Therefore, the EIR should include provide significant visual analysis from a variety of perspectives throughout the region, not just in the immediate vicinity project.

Noise

The EIR should evaluate the potential noise impacts of the new wind turbines. In addition to the potential nuisance noise the turbines could present to hikers in nearby open space, the noise could have significant impacts on wildlife. For example, noise in some decibel ranges may disrupt the echolocation system that bats use to navigate. Excess noise could also stress other wildlife found in the area.

Cumulative Impacts

The EIR should consider land uses throughout the area in analyzing how this project will add to cumulative impacts on wildlife habitat and open space resources.

Contra Costa Water District has recently approved a project which would expand the Los Vaqueros Reservoir, resulting in the flooding hundreds of acres of land. The land that will be flooded includes habitat and movement corridors for a number of special status species in the area. Los Vaqueros Reservoir is just north of the

APWRA. As habitat for special status species within the watershed is flooded, other suitable habitat for those species, such as that found within the APWRA, will become even more valuable.

Most notably, the Los Vaqueros project would flood a San Joaquin kit fox movement corridor on the western side of the reservoir. As a result, the only grassland corridor connecting the preserved open spaces in east Contra Costa County to the core of the kit fox habitat in the Altamont Hills and San Joaquin Valley would be the grasslands to the east and south of the reservoir. In other words, the proposed project site for the wind repowering projects would be part of the only remaining connection for kit fox dispersal. The significance of each kit fox den affected by grading and each kit fox potentially struck by a construction vehicle on the project site is greater when considering the loss of the kit fox corridor on the western side of Los Vaqueros.

Additionally, the Tres Vaqueros Wind Repowering project and the Vasco Winds project are currently being considered by Contra Costa County on land directly to the north of the Vasco Winds project. The Tres Vaqueros project proposes to replace 86 wind turbines with 42 larger wind turbines. The Vasco Winds project proposes to replace 420 wind turbines with 54 larger turbines. These projects are located just north of Highway 580 is close proximity to the APWRA repowering projects being considered by Alameda County. If both Contra Costa County projects are approved along with the two proposed Alameda County projects, the cumulative impacts on special status species and their habitat would be even more significant.

The EIR should consider the cumulative impacts of the Summit Wind Repowering Project and the NextEra Wind Powering Project along with the proposed Los Vaqueros project, the Tres Vaqueros project, the Vasco Winds project and other proposed or potential projects in the area.

Thank you for the opportunity to make comments on this project. SMD requests to receive notice of any further filings and will provide additional comments and questions at that time.

Sincerely,

Troy Bristol
Land Conservation Associate

Appendix C
Biological Resources Supporting Information

Appendix C1
Patterson Pass Biological Survey Results

April 9, 2014

Mr. Brian Sarantos
Project Developer
EDF Renewable Energy
4000 Executive Parkway, Suite 100
San Ramon, CA 94583

Subject: Biological Survey Results at the Patterson Pass Wind Project, Alameda County, California

Dear Mr. Sarantos:

As you requested, this report provides biological survey results for EDF Renewable Energy's (EDF RE's) proposed Patterson Pass Wind Project (Patterson or Proposed Project), located in Alameda County, California. EDF has submitted an application to Alameda County (County) for the Proposed Project and the County has initiated preparation of a Programmatic Environmental Impact Report (PEIR) (which includes a project specific analysis of Patterson and a programmatic analysis of the overall repowering program in the Altamont Pass Wind Resource Area (APWRA).

The Proposed Project will consist of the decommissioning of the existing wind facility, which includes approximately 321 Nordtank and Bonus wind turbines installed in the 1980's, and the installation of 8-12 modern wind turbines, with associated facilities. The model of wind turbine to be used for the repowering has not yet been selected but would generally consist of turbines between 2.4 and 3.0 megawatts (MW's), all generally similar in size and appearance, with relatively minor differences in blade length and total height. Existing roads would be used the extent feasible, although temporary widening and the construction of new roads will be required.

We understand that the County is largely using the biological information contained in the East Alameda Conservation Strategy (EACS) as the basis to assess impacts in PEIR, as well as to assign feasible mitigation measures, where necessary, to reduce or mitigate impacts. The EACS consists of information on land cover types, wetlands, and special-status species occurrences and habitats for all federally and state listed species in the region as well as several other non-listed species (i.e., burrowing owl). Consistent with your request, ICF biologists have conducted additional biological field surveys at the Proposed Project, to verify and further define the presence of land cover types, wetlands, and special-status species which may occur in the project area. Lastly, ICF biologists have also attended field reviews of the project site with representatives from the U.S. Fish and Wildlife Service (USFWS) (March 10, 2014), U.S. Army Corps of Engineers (USACE) (March 3, 2014), and the California Department of Fish and Wildlife (CDFW) (January 21, 2014) to discuss and review the proposed project, and coordination with those agencies is ongoing.

Methods

The following field surveys have been conducted to date to further describe the presence or potential presence of the remaining species and habitats on the project site.

- A wetland delineation conducted to U.S. Army Corps of Engineers protocols described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987[1]) and the supplemental procedures provided in the Regional Supplement to the *Corps of Engineers Manual for the Arid West Region* (U.S. Army Corps of Engineers 2008[2]).
- A field assessment for California tiger salamander following the USFWS's *Interim Guidance on Site Assessment and Field Surveys for Determining Presence of a Negative Finding of the California Tiger Salamander* (U.S. Fish and Wildlife Service 2003[3]).
- A field assessment for California red-legged frog following the USFWS's *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog* (U.S. Fish and Wildlife Service 2005[4]).
- A field assessment for vernal pool branchiopods.
- A field survey of potential habitat (elderberry shrubs) for the Valley elderberry longhorn beetle.
- An assessment for Alameda whipsnake.

The methods of each of these surveys and assessments are summarized briefly below.

Wetland Delineation

ICF International botanists/wetland ecologists, Robert Preston and Lisa Webber, conducted wetland delineation field surveys. Mr. Preston and Ms. Webber visited the project area on November 13 and December 10 and 11, 2013, and Mr. Preston visited the area on December 2, 2013. The delineation was conducted in accordance with the guidance provided in the 1987 *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987:53–69), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual for the Arid West Region* (U.S. Army Corps of Engineers 2008), and 33 *Code of Federal Regulations [CFR] 328.3(e)* and *329.11(a)(1)*. The ordinary high water mark (OHWM) was identified according to U.S. Army Corps of Engineers' Regulatory Guidance Letter No. 05-05 and the arid west field guide (U.S. Army Corps of Engineers 2005[5];

[1] Environmental Laboratory. 1987. *U.S. Army Corps of Engineers Wetlands Delineation Manual*. (Technical Report Y-87-1.) Vicksburg, MS: U.S. Army Waterways Experiment Station.

[2] U.S. Army Corps of Engineers. 2008. *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Arid West Region (Version 2.0)*. ed. J. S. Wakeley, R. W. Lichvar, and C.V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

[3] U.S. Fish and Wildlife Service. 2003. Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander.

[4] U.S. Fish and Wildlife Service. 2005. Revised Guidance on Site Assesments and Field Surveys for the California Red-legged Frog.

[5] U.S. Army Corps of Engineers. 2005. Ordinary High Water Mark Identification (Regulatory Guidance Letter No. 05-05). December 7, 2005.

Lichvar and McColley 2008[6]). Following the wetland delineation field surveys, a wetland delineation report was prepared (ICFI 2014[7]) and submitted to the USACE with a request for a verification of the mapping and requesting a preliminary jurisdictional determination (PJD). The USACE representative conducted a site visit with Ms. Webber on March 3, 2014 , which resulted in minor changes to the wetland delineation. A supplemental wetland delineation map and supporting data was submitted to the USACE on March 19, 2014 and the PJD is pending as of the preparation of this report.

California Tiger Salamander

In November 2013, ICF biologist John Howe assessed the project area for its potential to support California tiger salamander following the USFWS's *Interim Guidance on Site Assessment and Field Surveys for Determining Presence of a Negative Finding of the California Tiger Salamander* (U.S. Fish and Wildlife Service 2003). Prior to conducting the field assessment, Mr. Howe reviewed CNDDB (California Department of Fish and Wildlife 2014[8]) records for California tiger salamander within 3.1 miles (5 kilometers) and reviewed aerial photographs for ponds, vernal pools, and streams within 1.24 miles (2 kilometers) of the project area. Aquatic features within the project area were assessed on November 12 and 13, 2013. A datasheet for each aquatic feature was filled out and representative photographs were taken as outlined in the site assessment guidance. The information recorded included the type of aquatic feature, average and maximum depths, surface area, a description of emergent and bank vegetation, a description of adjacent upland habitat, and the general condition of the feature.

California Red-legged Frog

In November 2013, ICF biologist John Howe assessed the project area for its potential to support California red-legged frog following the USFWS's *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog* (U.S. Fish and Wildlife Service 2005). Prior to conducting the field assessment, Mr. Howe reviewed CNDDB (California Department of Fish and Wildlife 2014) records for California red-legged frog and aerial photographs for ponds and streams within 1 mile (1.6 kilometers) of the project area. Aquatic features within the project area were assessed on November 12 and 13, 2013. A datasheet for each aquatic feature was filled out and representative photographs were taken as outlined in the site assessment guidance. The information recorded included the type of aquatic feature, average and maximum depths, surface area, a description of

---

[6] Lichvar, R.W. and S.M. McColley. 2008. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual. Available: http://www.spk.usace.army.mil/Portals/12/documents/regulatory/pdf/Ordinary_High_Watermark_Manual_Aug_2008.pdf.

[7] ICF International. 2014. *Patterson Pass Wind Farm Repowering Project Delineation of Potential Waters of the United States*. February. (ICF 00563.13.) Sacramento, CA. Prepared for EDF Renewable Energy, San Ramon, CA.

[8] California Department of Fish and Wildlife. 2014. *California Natural Diversity Database, RareFind 4*. Report for Midway and surrounding USGS quadrangles. Sacramento, CA.

emergent and bank vegetation, a description of adjacent upland habitat, and the general condition of the feature.

Vernal Pool Branchiopods

Concurrently with assessments for California red-legged frog and California tiger salamander, ICF biologist John Howe also identified two areas that could support vernal pool branchiopods. One is a seasonal wetland in the northeast corner of the site that could support vernal pool fairy shrimp and longhorn fairy shrimp. This pool may not pool for a sufficient duration to support vernal pool tadpole shrimp. Two pooled areas within a drainage that runs through the western portion of the project site could support vernal pool tadpole shrimp but may contain too much flow during the wet season to support vernal pool fairy shrimp and longhorn fairy shrimp.

Valley Elderberry Longhorn Beetle

During the course of the habitat assessment for California red-legged frog and California tiger salamander, ICF biologist John Howe identified several elderberry shrubs in the western portion of the project area. Elderberry shrubs, meeting certain size requirements and within the range of the elderberry longhorn beetle, are considered habitat for the Valley elderberry longhorn beetle (VELB). All accessible elderberry shrubs found within the project area were therefore mapped using a Global Positioning System (GPS) unit. A large cluster of shrubs was identified on field maps and later digitized using GIS where access was not possible. The biologists conducted stem counts of accessible elderberry shrubs and recorded all stem diameters measuring at least 1 inch in diameter at ground level, consistent with current guidance from the USFWS. Each of the accessible stems was thoroughly searched for VELB exit holes. The biologists also recorded the shrub heights and dripline diameters, noted whether the shrub was located in riparian habitat or not, noted the general condition of the shrubs, and took representative photographs of the shrubs and any observed or suspect exit holes.

Alameda Whipsnake

During the course of the habitat assessment for California red-legged frog and California tiger salamander, ICF biologist John Howe also assessed the project area for Alameda Whipsnake habitat. Mr. Howe observed the general site conditions and noted what suitable habitat elements were present or absent from the project site.

Results

Wetland Delineation

The project area was found to support five distinct vegetation communities— nonnative annual grassland, emergent wetland, riparian wetland, seasonal wetland, and ephemeral drainage (which support nonnative annual grassland vegetation). In addition, unvegetated ponds occur in the delineation area. A total of 12.051 acres of waters of the United States were identified in the 953-acre delineation area, including emergent wetlands (4.992 acres), riparian wetlands (4.000 acres), seasonal wetlands (1.405 acres), ephemeral drainages (0.814 acre), and ponds (0.840 acre). Wetland delineation maps of the project area (revised based on a verification visit with the USACE and pending verification by the USACE) are attached as Appendix A. A brief summary of the upland and wetland habitat types and communities identified in the project area is provided below.

Nonnative Annual Grassland

Nonnative annual grassland, the most common biological community in the project area, corresponds to the California annual grassland land cover type identified in the East Alameda County Conservation Strategy (EACCS). It is an herbaceous community dominated by naturalized annual grasses with intermixed perennial and annual forbs. Annual grasslands in the project area are heavily grazed, which resulted in many species being unidentifiable at the time of the November and December 2013 surveys and/or the extent of species to be indistinct. Dominant species observed include soft chess brome (*Bromus hordeaceous*), big heronbill (*Erodium botrys*), redstemmed filaree (*E. cicutarium*), Italian ryegrass (*Festuca perennis* [*Lolium multiflorum*]), and Mediterranean barley (*Hordeum marinum* var. *gussoneanum*).

Emergent Wetland

Emergent wetlands occur within drainages that are perennially wet due to groundwater seeps and in basin-shaped features around ponds. This community type corresponds to the perennial freshwater marsh land cover type identified in the EACCS. Species observed in emergent wetlands in drainages include saltgrass (*Distichlis spicata*), Mediterranean barley, Baltic rush (*Juncus balticus*) , Chilean rabbit's-foot grass (*Polypogon australis*), watercress (*Nasturtium officinale* [*Rorippa nasturtium-aquaticum*]), willows (*Salix* spp.), and stinging nettle (*Urtica dioica* ssp. *holosericea*).

Species observed in emergent wetlands around ponds include willowherb (*Epilobium ciliatum*), Italian ryegrass, smartweed (*Persicaria lapathifolium*), Chilean rabbit's-foot grass, celery-leaved buttercup (*Ranunculus scleratus*), arroyo willow (*Salix lasiolepis*), small-flowered saltcedar (*Tamarix parviflora*), cattail (*Typha* sp.), and stinging nettle.

Riparian Wetland

Riparian wetlands occur in perennial drainages in the western part of the delineation area. This community type corresponds to the mixed willow riparian scrub land cover type identified in the EACCS. These drainages support a woody riparian overstory, dominated by red willow (*Salix lasiandra*) and arroyo willow, and an herbaceous understory similar to the emergent wetland vegetation, with species such as Baltic rush, watercress, and rabbit's-foot grass.

Seasonal Wetland

Seasonal wetlands in the delineation area occur in shallow depressions generally associated with ephemeral drainages and emergent wetlands. This community type corresponds to the seasonal wetland land cover type identified in the EACCS. During the November and December 2013 surveys, vegetation in these areas was heavily grazed, resulting in few identifiable remnants of vegetation and seedlings that were too small to reliably identify to species. Recognizable species observed included Mediterranean barley and Italian ryegrass, as well as several upland species that likely colonized during the dry season, including soft chess, black mustard (*Brassica nigra*), redstemmed filaree, and common tarweed (*Holocarpha virgata*).

Ephemeral Drainage

Ephemeral drainages occur in low-lying areas and valley bottoms in the delineation area. This community type corresponds to the stream land cover type identified in the EACCS. Some of the ephemeral drainages are associated with wetlands or ponds, or they transition to emergent wetlands where there is a seep in a drainage. Ephemeral drainages are unvegetated or support nonnative annual grassland species, as described above.

Pond

In the delineation area, ponds are small permanent bodies of water that have been constructed for the purposes of retaining runoff water for livestock use. This community type corresponds to the pond land cover type identified in the EACCS. The surface area of these features varies, depending on the time of year. Ponds are mostly unvegetated, but support a narrow fringe of cattail or scattered cattail plants. Within the delineation area, ponds are partially to entirely surrounded by emergent wetland vegetation.

California Red-legged Frog

Eight CNDDB records for California red-legged occur within 1 mile of the project area (California Department of Fish and Wildlife 2014). There are four records of California red-legged frog in five of the ponds within the project area from July 2005 (California Department of Fish and Wildlife 2014). Additionally, there is one other record from July 2005 in the CNNDB (occurrence #880), which is not associated with a pond. The record is approximately 0.1 mile east of one of the ponds in the project area, and the observation was made on the same date and has the same source as the other four records in the project area, which suggests that the CNDDB polygon for this record is actually the pond within the project area. A single adult California red-legged frog was also observed in this pond on November 12, 2013 by ICF biologist John Howe. Consequently, there appear to be five records of California red-legged frog in the project area.

Eighteen ponds and several streams were identified within 1 mile of the project area, which includes five ponds that are known to be occupied by California red-legged frog. All of the ponds within the project area were observed to have water at the time of the surveys and had average depths that were estimated to be between 1 to 6 feet. All of the ponds were observed with areas of emergent cattails and open water. The other aquatic feature (stream, ephemeral drainages, vernal pool, and seasonal wetlands) do not represent suitable habitat for California red-legged frog breeding. The stream going through the western half of the project area generally consists of an incised channel with sections of saturated perennial wetlands that form from seeps throughout the drainage. There are two sections of the channel that pool to maximum depth of approximately 12 inches during the wet season, which make them not likely suitable for California red-legged frog breeding. They were dry during the November 2013 site visits. No bullfrogs where observed in any of the aquatic habitats within the project area.

Figure 1 indicates the location of suitable aquatic habitats for California red-legged frog within the project area.

California Tiger Salamander

Seventeen CNDDB records for California tiger salamander occur within 3.1 miles of the project area (California Department of Fish and Wildlife 2014). The nearest California tiger salamander CNDDB record (occurrence #810) to the site is a road-caused mortality on Patterson Pass Road immediately adjacent to the project area from October 2001.

Twenty-four ponds and several streams were identified within 1.24 miles of the project area, which includes five ponds and one stream within the project area that could support California tiger salamander. All of the ponds within the action area were observed to have water at the time of the surveys and had average depths that were estimated to be between 1 to 6 feet. All of the ponds were observed with areas of emergent cattails and open water. A stream that runs through the northwest corner of the project area has two large pools within it that appear to pool water seasonally and have an estimated maximum depth of 12 inches. The other sections of this stream, the ephemeral drainages, and the vernal pool within the project area do not appear to have sections that pool water (stream and drainages) or do not appear to pool to a sufficient depth or for a long enough duration (seasonal wetland or vernal pool) to support California tiger salamander. No bullfrogs where observed in any of the aquatic habitats within the project area. The ponds and the two instream pools all appear to be suitable for California tiger salamander.

Figure 1 indicates the location of suitable aquatic habitats for California tiger salamander within the project area.

Vernal Pool Branchiopods

ICF biologist John Howe conducted an assessment of aquatic habitats in the project area for their suitability to support California tiger salamander and California red-legged frog during which he identified two areas that could support vernal pool branchiopods. One of these is a small depression near the northeast corner of the project area (Figure 1). This feature was estimated to pool seasonally to an average depth of 8 inches and a maximum depth of 24 inches. The depression was dry at the time of the assessment. The wetland delineation conducted by ICF in November and December 2013 identified this feature as a seasonal wetland with an area of 0.031 acre. At the time of the delineation it was observed to be vegetated with upland species though it did have hydric soils and observable inundation in aerial photos from March 2011 and May 2013 (ICF 2014). This seasonal wetland is considered to be suitable for vernal pool branchiopods though it may not pool for a long enough duration to support vernal pool tadpole shrimp.

The other area consists of two pools within a drainage in the northwest corner of the project area (Figure 1). Both of the pools are upstream of culverted road crossings over the drainage. The pools both were estimated to pool seasonally to an average depth of 6 inches and a maximum depth of 12 inches. Both pools were observed to be dry at the time of the assessment. These pools were estimated to be 0.05 acre and 0.35 acre. The wetland delineation conducted by ICF identified the pools and associated drainage to be part of a larger emergent wetland and were not delineated separately. These pools are considered suitable for vernal pool tadpole shrimp but may not support vernal pool fairy shrimp and longhorn fairy shrimp due to flows passing through these pools.

Figure 1 indicates the location of the two areas identified as potential habitat for vernal pool branchiopods.

Valley Elderberry Longhorn Beetle

ICF biologists recorded a total of 39 shrubs, potential habitat for VELB, within the project area. The results of the elderberry shrub surveys are summarized in Table 1 below. Due to the steepness of the terrain several shrubs were not accesses at the time of the survey. Stem diameter classes were estimated using binoculars. Shrub cluster #8 was also in a very steep area and though accessed to count the shrubs and look for exit holes surveys, the stem counts provided in the table were estimated due to safety issues in accessing every shrub. The estimates were made with the knowledge that EDF would not directly impact these shrubs. The locations of the elderberry shrubs are shown in Figure 1.

Table 1. Elderberry Shrub Survey Results

Shrub/Cluster Number	Stem Diameter Class at Ground Level in Inches			Shrub Height in Feet	Exit Holes Present?	Shrub in Riparian Habitat?
	≥1–≤3	>3–<5	≥ 5			
1	0	2	1	11	No	Yes
2	5	1	3	15	Yes	Yes
3	2	0	0	7	No	Yes
4	0	0	1	15	Yes	Yes
5	0	0	1	25	NA	Yes
6[1]	0	0	1	25	NA	Yes
7[1]	0	0	1	15	NA	Yes
8[2] (32 shrubs)	NA	NA	NA	10-15	Yes	No

[1] Couldn't safely access shrubs. Stem counts estimated using binoculars and/or based on overall size of the shrub.
[2]For shrub cluster 8, stem counts were not estimated due to safety issues in accessing all of the shrubs. Exit holes were observed on most of the shrubs that were accessible.

As shown in Table 1 above, 39 elderberry shrubs that had one or more stems greater than 1 inch in diameter at ground level were identified within the action area at the time of the surveys. Seven of these shrubs are located in riparian habitat along an unnamed stream running through the western portion of the project area. Several shrubs were observed with exit holes on live and dead stems that were similar in size and shape to those exit holes made by valley elderberry longhorn beetle, which suggests that the species occurs within the project area.

Figure 1 indicates the location of the elderberry shrubs within the project area.

Alameda Whipsnake

The project area is generally within the range of Alameda whipsnake, which is currently defined as Contra Costa County, most of Alameda County, and small portions of northern Santa Clara and western San Joaquin Counties (U.S. Fish and Wildlife Service 2011[9]). The CNDDB record locations for Alameda whipsnake are suppressed in the dataset due to the sensitivity of the species; however

[9] U.S. Fish and Wildlife Service. 2011. Alameda whipsnake (*Masticophis lateralis euryxanthus*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Sacramento, CA. September.

the CNDDB does note that there are seven extant records within the Midway USGS quadrangle, in which the project area is found. The available information for these records indicate they are south of the action area by approximately 2.5 miles. There are no CNDDB records for the quadrangles to the east (Tracy), west (Altamont), or north (Clifton Court Forebay) of the action area; however there are records for the Byron Hot Springs quadrangle, which is northwest of the Midway quadrangle. A review of aerial imagery for this quadrangle show what appears to be chaparral and/or coast scrub approximately 9 miles northwest of the project area.

The project area provides habitats that could be used by Alameda whipsnake (grasslands and rock outcrops). Alameda whipsnake species typically occurs in these habitats when adjacent to (within 500 feet) chaparral or coastal scrub habitats; however, the species has been reported as far 4.5 miles from the nearest chaparral or coastal scrub (U.S. Fish and Wildlife Service 2011). The nearest chaparral or coastal scrub mapped in the EACCS landcover data is approximately 2.5 miles south of the action area. There is no chaparral or coastal scrub mapped within the EACCS landcover dataset to the north or east of the project area. The nearest chaparral or coastal scrub to the west of the project area is west of I-680, which is approximately 17 miles away.

Alameda whipsnake could occur in the project area; however this likelihood is considered low because it does not contain chaparral or coastal scrub habitat, the nearest primary habitat is 2.5 miles south of the project area, and the project area does not provide a linkage between this habitat and any suitable habitat to the north, west, or east of the project area.

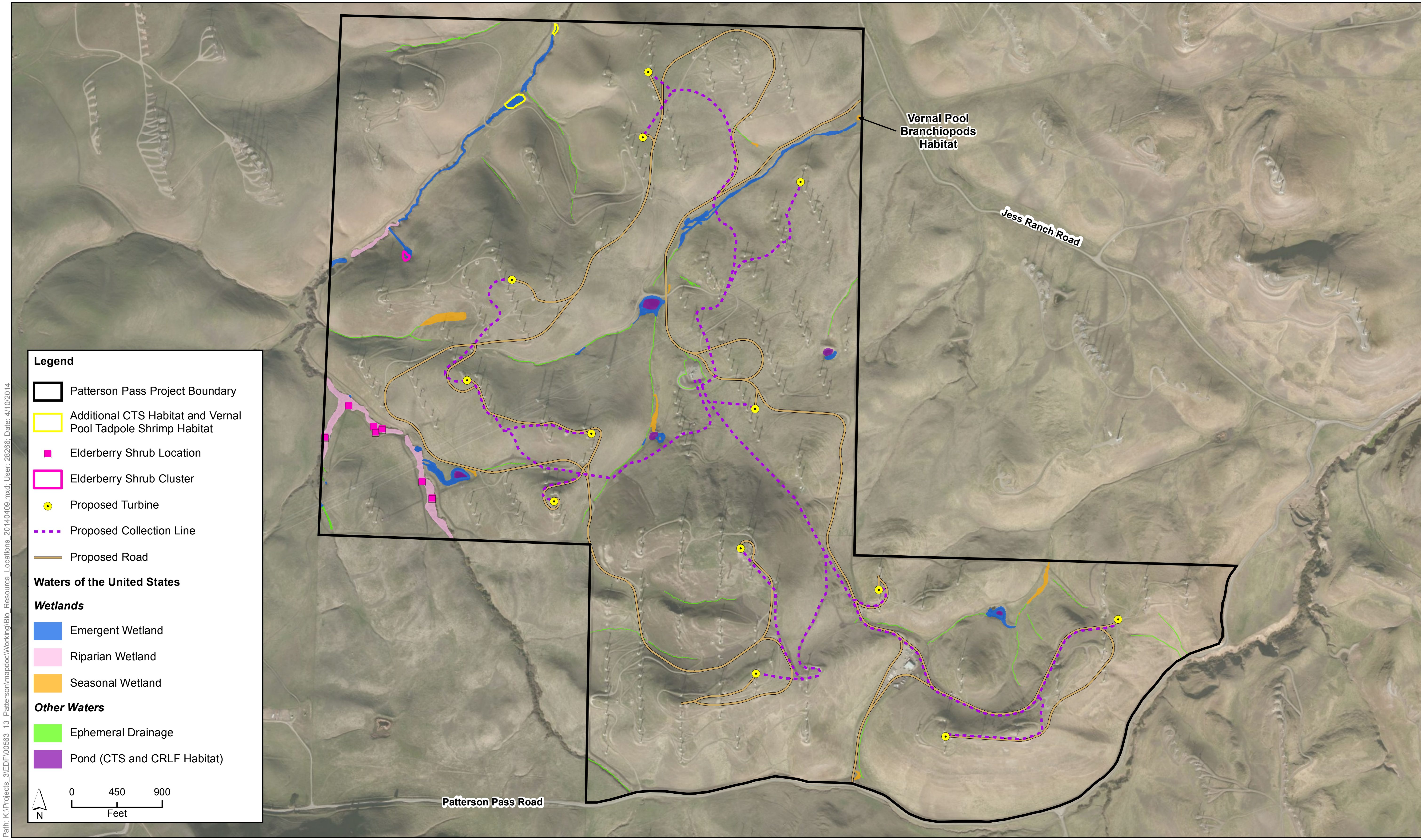
Thank you for the opportunity to assist you with the Proposed Project. If you have any questions regarding the information in this report, please contact me at 916-231-9565 or (brad.schafer@icfi.com).

Sincerely,

Brad Schafer
Project Manager/Biologist

Attachment-Figure 1 and Attachment A.

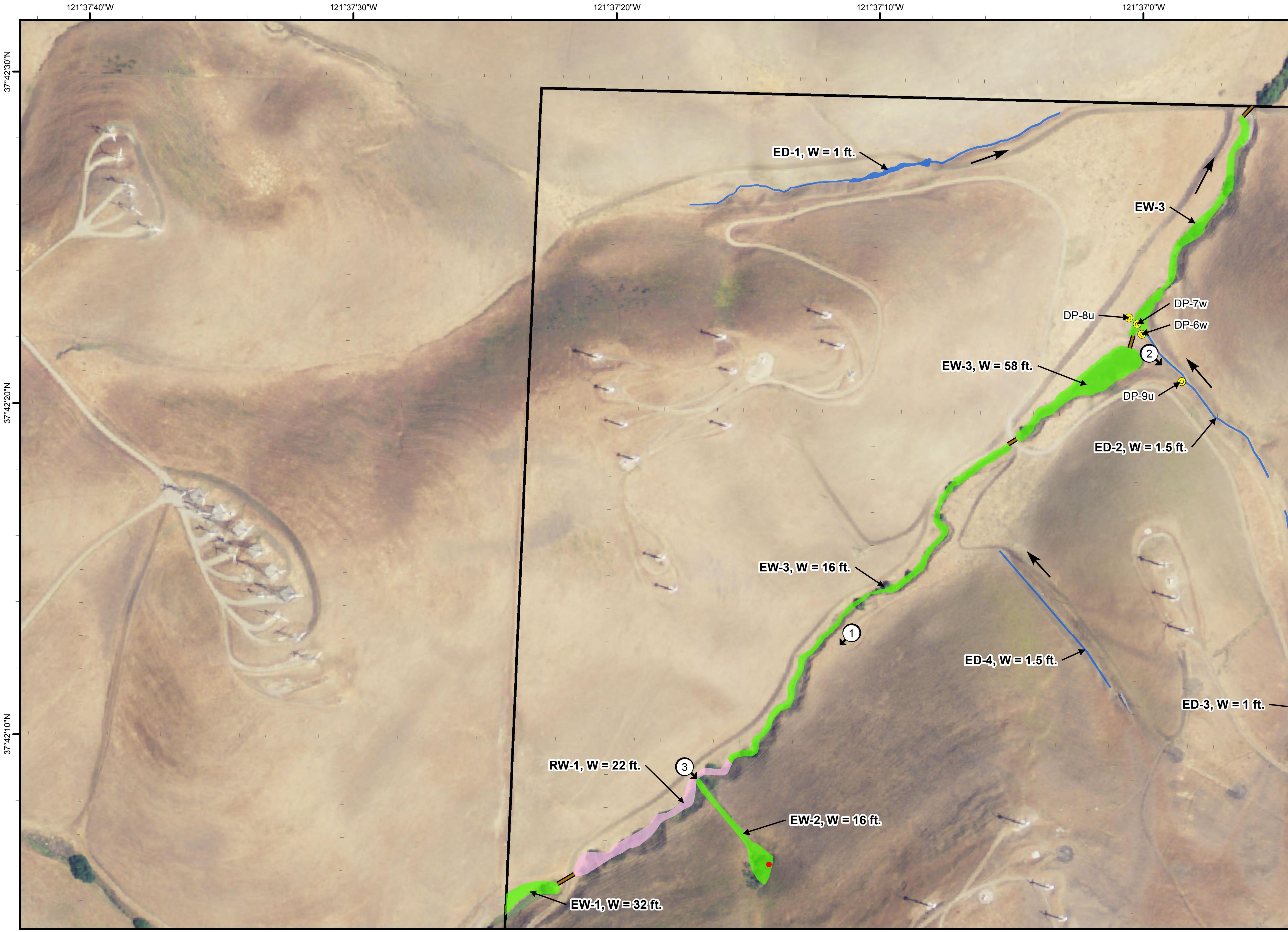
cc: Rick Miller and Kathryn Malone, EDF-RE
Brad Norton, ICF International



Path: K:\Projects_3\EDF\00563_13_Patterson\mapdoc\Working\Bio_Resource_Locations_20140409.mxd; User: 28266; Date: 4/10/2014

Figure 1
Biological Resources Locations

Attachment A. Wetland Delineation Maps



Patterson Pass Wind Project
March 2014
Sheet 1 of 6

Legend

- Delineation Area (953 acres)
- Seep Location
- Photo Points
- Data Points
- Direction of Flow
- Culvert

Waters of the United States

Wetlands

- Emergent Wetland (EW) - 4.992 acres
- Riparian Wetland (RW) - 4.000 acres

Other Waters

- Ephemeral Drainage (ED) - 0.849 acre

N

0 150 300
Feet

1 inch = 300 feet

Notes:

Imagery Source: NAIP 2012
USGS Topo Quad: Midway
PLSS: Sections: 2, 11 and 12; Township: 03S; Range 03E

Prepared by: Lisa Webber/916.737.3000
Delineated by: Lisa Webber and Robert Preston
Field survey dates: November 2013, December 2013 and March 2014
Drawn by: Edward Douglas

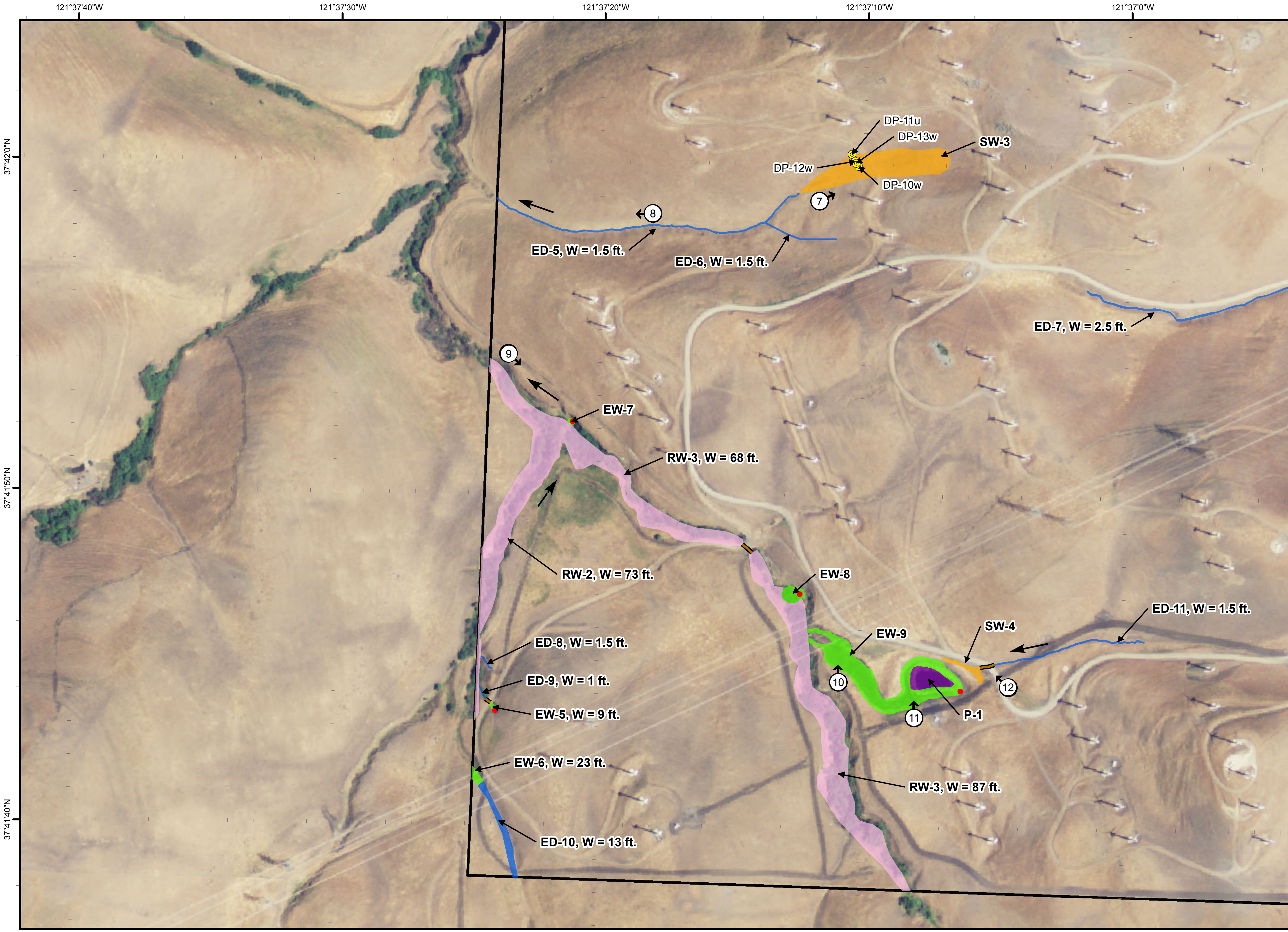
Path: K:\Projects_3\EDF\00563_13_Patterson\mapdoc\Working\WUS_Mapbook_20140306.mxd; Author: psilveira; Date: 3/6/2014

ICF INTERNATIONAL

Appendix A
Delineation of Potential Waters of the United States, Including Wetlands

Appendix A
Delineation of Potential Waters of the United States, Including Wetlands

Patterson Pass Wind Project
March 2014
Sheet 3 of 6



Legend

- Delineation Area (953 acres)
- Seep Location
- Photo Points
- Data Points
- Direction of Flow
- Culvert

Waters of the United States

Wetlands

- Emergent Wetland (EW) - 4.992 acres
- Riparian Wetland (RW) - 4.000 acres
- Seasonal Wetland (SW) - 1.323 acres

Other Waters

- Ephemeral Drainage (ED) - 0.849 acre
- Pond (P) - 0.840 acre

N

0 150 300
Feet

1 inch = 300 feet

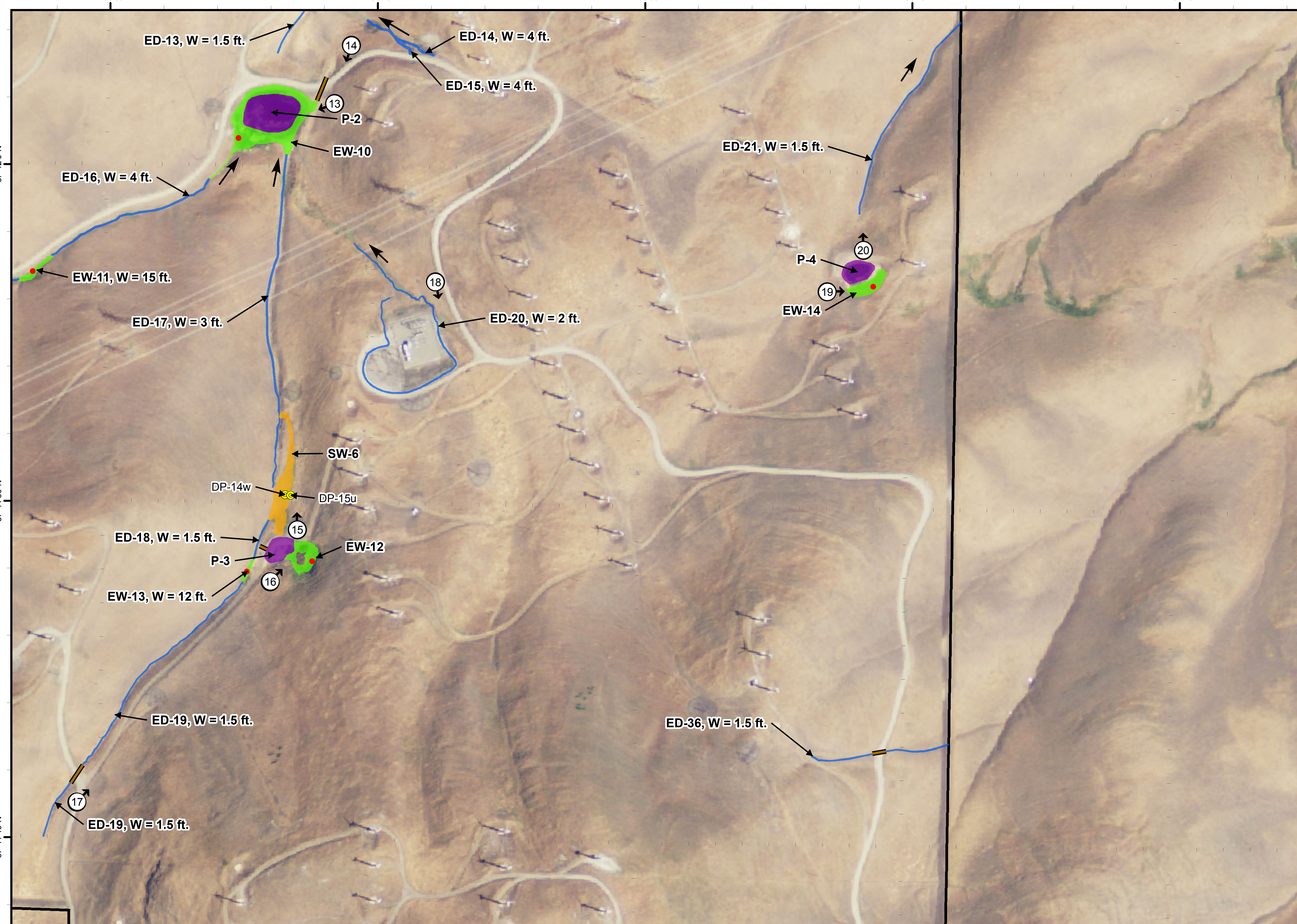
Notes:
Imagery Source: NAIP 2012
USGS Topo Quad: Midway
PLSS: Sections: 2, 11 and 12; Township: 03S; Range 03E

Prepared by: Lisa Webber/916.737.3000
Delineated by: Lisa Webber and Robert Preston
Field survey dates: November 2013, December 2013 and March 2014
Drawn by: Edward Douglas

Path: K:\Projects_3\EDF\00563_13_Patterson\mapdoc\Working\WUS_Mapbook_20140306.mxd; Author: psilveira; Date: 3/6/2014

ICF INTERNATIONAL

Appendix A
Delineation of Potential Waters of the United States, Including Wetlands



Patterson Pass Wind Project
March 2014
Sheet 4 of 6

Legend

- Delineation Area (953 acres)
- Seep Location
- Photo Points
- Data Points
- Direction of Flow
- Culvert

Waters of the United States

Wetlands

- Emergent Wetland (EW) - 4.992 acres
- Seasonal Wetland (SW) - 1.323 acres

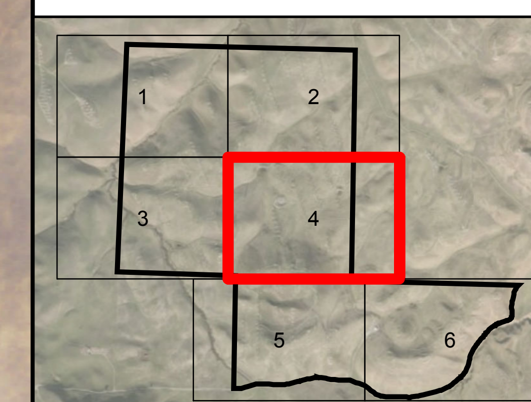
Other Waters

- Ephemeral Drainage (ED) - 0.849 acre
- Pond (P) - 0.840 acre

N

0 150 300
Feet

1 inch = 300 feet



Notes:

Imagery Source: NAIP 2012
USGS Topo Quad: Midway
PLSS: Sections: 2, 11 and 12; Township: 03S; Range 03E

Prepared by: Lisa Webber/916.737.3000
Delineated by: Lisa Webber and Robert Preston
Field survey dates: November 2013, December 2013 and March 2014
Drawn by: Edward Douglas

Path: K:\Projects_3\EDF\00563_13_Patterson\mapdoc\Working\WUS_Mapbook_20140306.mxd; Author: psilveira; Date: 3/6/2014

ICF INTERNATIONAL

Appendix A
Delineation of Potential Waters of the United States, Including Wetlands

Patterson Pass Wind Project
March 2014
Sheet 5 of 6

Legend

Delineation Area (953 acres)

Photo Points

Direction of Flow

Culvert

Waters of the United States

Wetlands

Seasonal Wetland (SW) - 1.323 acres

Other Waters

Ephemeral Drainage (ED) - 0.849 acre

0 150 300
Feet

1 inch = 300 feet

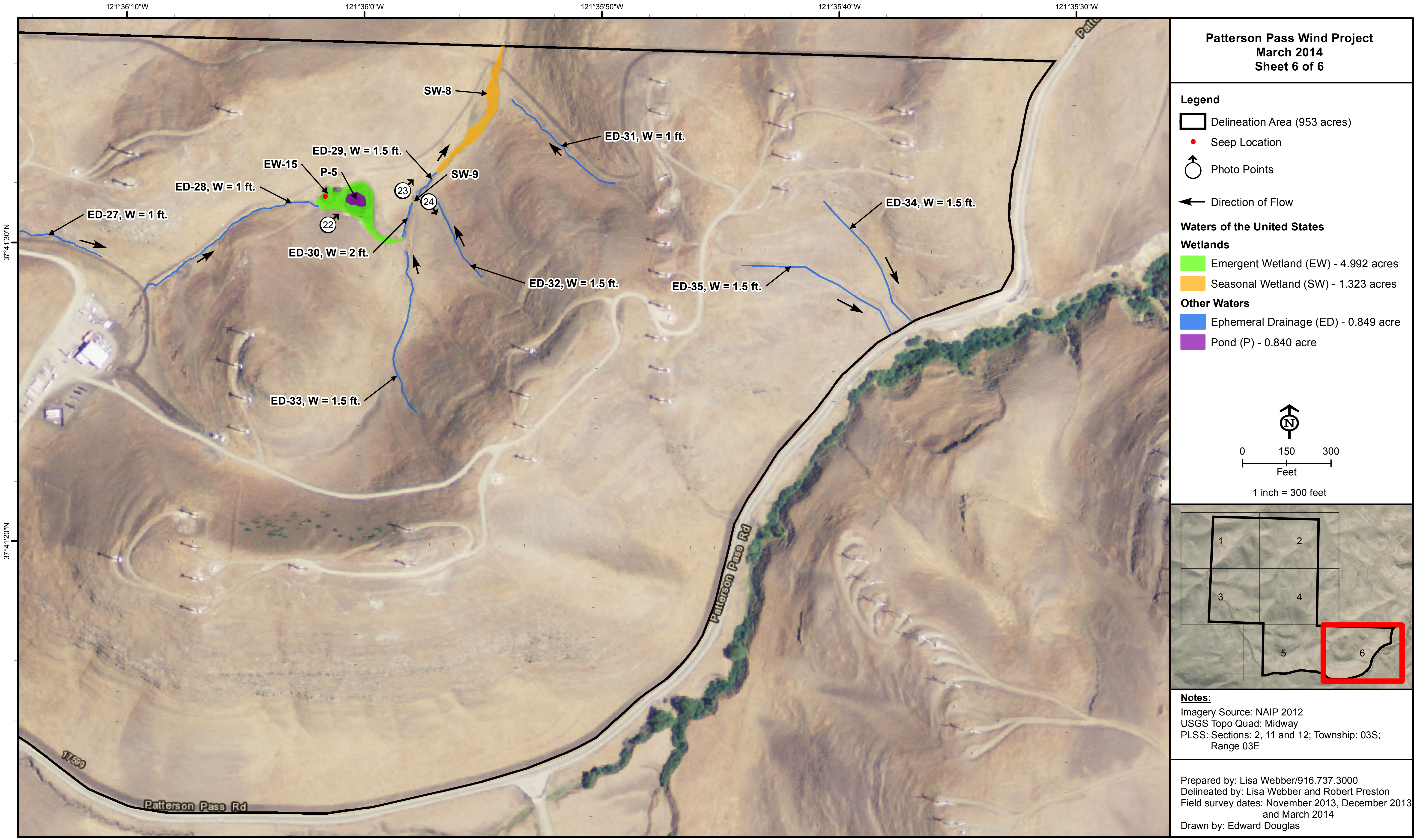
Notes:

Imagery Source: NAIP 2012
USGS Topo Quad: Midway
PLSS: Sections: 2, 11 and 12; Township: 03S; Range 03E

Prepared by: Lisa Webber/916.737.3000
Delineated by: Lisa Webber and Robert Preston
Field survey dates: November 2013, December 2013 and March 2014
Drawn by: Edward Douglas

Path: K:\Projects_3\EDF\00563_13_Patterson\mapdoc\Working\WUS_Mapbook_20140306.mxd; Author: psilveira; Date: 3/6/2014

Appendix A
Delineation of Potential Waters of the United States, Including Wetlands



ICF INTERNATIONAL

Appendix A
Delineation of Potential Waters of the United States, Including Wetlands

Appendix C2

East Alameda County Conservation Strategy Mitigation Ratios and Locations

Table 3-4. Standardized Mitigation Ratios for Vernal Pool Fairy Shrimp in the EACCS Study Area

	Location of Mitigation[1,2]				
Location of Impact[1]	Inside Critical Habitat in EACCS study area	Outside Critical Habitat and Inside Vernal Pool Recovery Unit	Outside Critical Habitat and Outside Vernal Pool Recovery Unit	Outside EACCS Study Area	Notes
Inside Critical Habitat in EACCS study area	9:1—(6 acres preservation; 3 acres restoration) *requires site-specific USFWS approval	10:1—(6.5 acres preservation; 3.5 acres restoration) *requires site-specific USFWS approval	11:1—(7 acres preservation; 4 acres restoration) *requires site-specific USFWS approval	Requires site-specific agency approval	In order to preserve 90% of vernal pool fairy shrimp habitat, consistent with the goals and objectives of the EACCS, a high ratio is required due to the rarity of this habitat type.
Outside Critical Habitat and Inside Vernal Pool Recovery Unit	9:1—(6 acres preservation; 3 acres restoration)	9:1—(6 acres preservation; 3 acres restoration)	10:1—(6.5 acres preservation; 3.5 acres restoration)	Requires site-specific agency approval	
Outside Critical Habitat and Outside Vernal Pool Recovery Unit	9:1—(6 acres preservation; 3 acres restoration)	10:1—(6.5 acres preservation; 3.5 acres restoration)	11:1—(7 acres preservation; 4 acres restoration)	Requires site-specific agency approval	

[1] Reference Figure 3-6 for the location of key mitigation features for vernal pool fairy shrimp.

[2] In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

Table 3-5. Standardized Mitigation Ratios for Longhorn Fairy Shrimp in the EACCS Study Area

	Location of Mitigation[1, 2]				
Location of Impact[1]	Inside Critical Habitat in EACCS study area	Outside Critical Habitat and Inside Vernal Pool Recovery Unit	Outside Critical Habitat and Outside Vernal Pool Recovery Unit	Outside EACCS Study Area	Notes
Inside Critical Habitat in EACCS study area	9:1—(6 acres preservation; 3 acres restoration) *requires site-specific USFWS approval	10:1—(6.5 acres preservation; 3.5 acres restoration) *requires site-specific USFWS approval	11:1—(7 acres preservation; 4 acres restoration) *requires site-specific USFWS approval	Requires site-specific agency approval	In order to preserve 90% of longhorn fairy shrimp habitat, consistent with the goals and objectives of the EACCS, a high ratio is required due to the rarity of this habitat type.
Outside Critical Habitat and Inside Vernal Pool Recovery Unit	9:1—(6 acres preservation; 3 acres restoration)	9:1—(6 acres preservation; 3 acres restoration)	10:1—(6.5 acres preservation; 3.5 acres restoration)	Requires site-specific agency approval	
Outside Critical Habitat and Outside Vernal Pool Recovery Unit	9:1—(6 acres preservation; 3 acres restoration)	10:1—(6.5 acres preservation; 3.5 acres restoration)	11:1—(7 acres preservation; 4 acres restoration)	Requires site-specific agency approval	

1 Reference Figure 3-7 for the location of key mitigation features for longhorn fairy shrimp.

2 In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

Table 3-6. Standardized Mitigation Ratios for Callippe Silverspot Butterfly in the EACCS Study Area

	Location of Mitigation[1, 2]				
Location of Impact	Within CZ where impact occurred	Adjacent to CZ where impact occurred and inside mitigation area shown in Figure 3-8	In CZ Not Adjacent to CZ where impact occurred but inside mitigation area shown in Figure 3-8	Outside mitigation area shown in Figure 3-8 including an area outside EACCS Study Area	Notes
Inside Conservation Zones CZ1, CZ8, CZ11, CZ12, CZ14, CZ15, CZ16	3:1	3.5:1	4:1	Requires site-specific agency approval	

[1] Reference Figure 3-8 for the location of key mitigation features for callippe silverspot butterfly.

[2] In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

Table 3-7. Standardized Mitigation Ratios for California Red-Legged Frog in the EACCS Study Area

	Location of Mitigation[1, 2]					
Location of Impact[1]	Inside Critical Habitat in EACCS study area in same CRLF Mitigation Area based on Figure 3-9	Inside Critical Habitat in EACCS study area in different CRLF Mitigation Area based on Figure 3-9	Outside Critical Habitat but inside same CRLF Mitigation Area based on Figure 3-9	Outside Critical Habitat in EACCS study area in different CRLF Mitigation Area based on Figure 3-9	Outside EACCS Study Area	Notes
Inside Critical Habitat in EACCS study area	3:1	Requires site specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	
Outside Critical Habitat in EACCS study area	2.5:1	3:1	3:1	3.5:1	Requires site-specific agency approval	

1 Reference Figure 3-9 for the location of key mitigation features for California red-legged frog.

2 In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

Table 3-8. Standardized Mitigation Ratios for California Tiger Salamander in the EACCS Study Area

Location of Impact[1]	Location of Mitigation[1, 2] Inside Critical Habitat in EACCS study area	Outside Critical Habitat but inside CTS North Mitigation Area, north of I-580	Outside Critical Habitat but inside CTS North Mitigation Area, south of I-580	Outside Critical Habitat but inside CTS South Mitigation Area, west of I-680	Outside Critical Habitat but inside CTS South Mitigation Area, east of I-680	Outside of EACCS Study Area	Notes
Inside Critical Habitat in EACCS study area	3:1	Requires site specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	
Outside Critical Habitat but inside CTS North Mitigation Area, north of I-580	2.5:1	3:1	3.5:1	4:1	4:1	Requires site-specific agency approval	Shaffer et al. 2004 found that there is some genetic distinction between CTS in the Central Valley Ecological Zone and the Western California Ecological Zone. Those zones were used to create CTS North and South Mitigation Areas.
Outside Critical Habitat but inside CTS North Mitigation Area, south of I-580	3:1	3.5:1	3:1	4:1	4:1	Requires site-specific agency approval	
Outside Critical Habitat but inside CTS South Mitigation Area, west of I-680	3:1	4:1	4:1	3:1	3.5:1	Requires site-specific agency approval	
Outside Critical Habitat but inside CTS South Mitigation Zone, east of I-680	3:1	4:1	4:1	3.5:1	3:1	Requires site-specific agency approval	

1 Reference Figure 3-10 for the location of key mitigation features for California tiger salamander.

2 In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

Table 3-9. Standardized Mitigation Ratios for Alameda Whipsnake in the EACCS Study Area

	Location of Mitigation[1]					
Location of Impact[1]	Inside Critical Habitat Unit in same recovery unit[2]	Inside Critical Habitat Unit in different recovery unit	Outside Critical Habitat but Inside Same Recovery Unit	Outside Critical Habitat and Inside Different Recovery Unit	Outside Critical Habitat and Outside Recovery Unit	Outside EACCS Study Area
Inside Critical Habitat	3:1	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval
Outside Critical Habitat but Inside Recovery Unit	2.5:1	3:1	3:1	3.5:1	4:1	Requires site-specific agency approval
Outside Critical Habitat and Outside Recovery Unit	2.5:1	2.5:1	3:1	3:1	3:1	Requires site-specific agency approval

[1] Reference Figure 3-12 for the location of key mitigation features for Alameda whipsnake.

[2] Agency approval will be required to mitigate impacts that occur inside Critical Habitat Unit 5a in Critical Habitat Unit 5b and vice versa, even though they are inside the same recovery unit.

Table 3-10. Standardized Mitigation Ratios for Non-Listed Species in the EACCS Study Area

	Location of Mitigation[1, 2]					
Location of Impact[1]	Within East Bay Hills Mitigation Area	Within Livermore Valley Mitigation Area	Within Altamont Hills Mitigation Area	Within Northern Diablo Range Mitigation Area	Outside EACCS Study Area	Notes
Within East Bay Hills Mitigation Area	3:1	3.5:1	4:1	3.5:1	Requires site-specific agency approval	
Within Livermore Valley Mitigation Area	3.5:1	3:1	3.5:1	3.5:1	Requires site-specific agency approval	
Within Altamont Hills Mitigation Area	4:1	3.5:1	3:1	3.5:1	Requires site-specific agency approval	
Within Northern Diablo Range Mitigation Area	3.5:1	3.5:1	3.5:1	3:1	Requires site-specific agency approval	

1 Reference Figure 3-11 for the location of key mitigation features for non-listed species in the EACCS study area.

2 In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

Table 3-11. Standardized Mitigation Ratios for San Joaquin Kit Fox in the EACCS Study Area

Location of Impact[1]	Location of Mitigation[1, 2]: Inside SJKF North Mitigation Area as shown in Figure 3-13	Inside SJKF East Mitigation Area as shown in Figure 3-13	Inside SJKF South Mitigation Area as shown in Figure 3-13	Inside SJKF Central-West Mitigation Area as shown in Figure 3-13	Outside of EACCS Study Area	Notes
Inside SJKF North Mitigation Area as shown in Figure 3-13	3:1	3:1	3:1	N/A	Requires site-specific agency approval	
Inside SJKF East Mitigation Area as shown in Figure 3-13	3.5:1	3:1	3.5:1	N/A	Requires site-specific agency approval	Ratios may rise in areas of documented high occurrence or movement corridors.
Inside SJKF South Mitigation Area as shown in Figure 3-13	3.5:1	3:1	3:1	N/A	Requires site-specific agency approval	
Inside SJKF Central-West Mitigation Area as shown in Figure 3-13	N/A	N/A	N/A	N/A	Requires site-specific agency approval	

1 Reference Figure 3-13 for the location of mitigation areas for San Joaquin kit fox.

2 In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

Table 3-12. Standardized Mitigation Ratios for Focal Plant Species in the EACCS Study Area[1]

	Location of Mitigation[2, 3]					
Location of Impact[2]	Within East Bay Hills Mitigation Area	Within Livermore Valley Mitigation Area	Within Altamont Hills Mitigation Area	Within Northern Diablo Range Mitigation Area	Outside EACCS Study Area	Notes
Within East Bay Hills Mitigation Area	5:1	With agency approval	With agency approval	With agency approval	With agency approval	
Within Livermore Valley Mitigation Area	With agency approval	5:1	With agency approval	With agency approval	With agency approval	
Within Altamont Hills Mitigation Area	With agency approval	With agency approval	5:1	With agency approval	With agency approval	
Within Northern Diablo Range Mitigation Area	With agency approval	With agency approval	With agency approval	5:1	With agency approval	

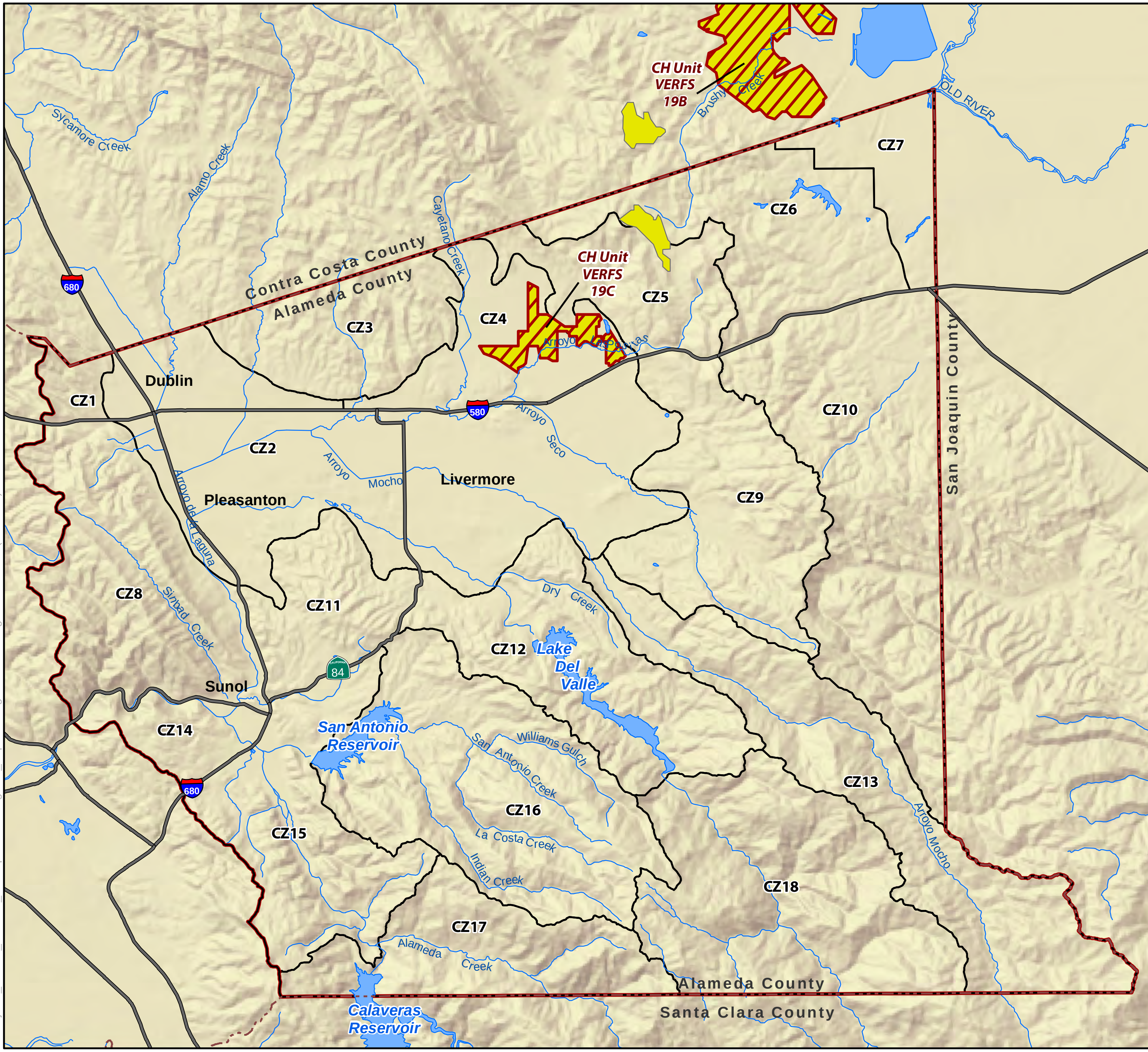
1 Mitigation ratios for focal plant species refer to the size of the population that is effected or protected. Restoration ratio refers to reestablishing or increasing the size of an existing population. The quality/vigor of a population would need to be considered when making final determinations.

2 Reference Figure 3-11 for the location of key mitigation features for plants and non-listed species in the EACCS study area.

3 In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

Figure 3-6
Vernal Pool Fairy Shrimp Standardized Mitigation Reference Map

October 2010



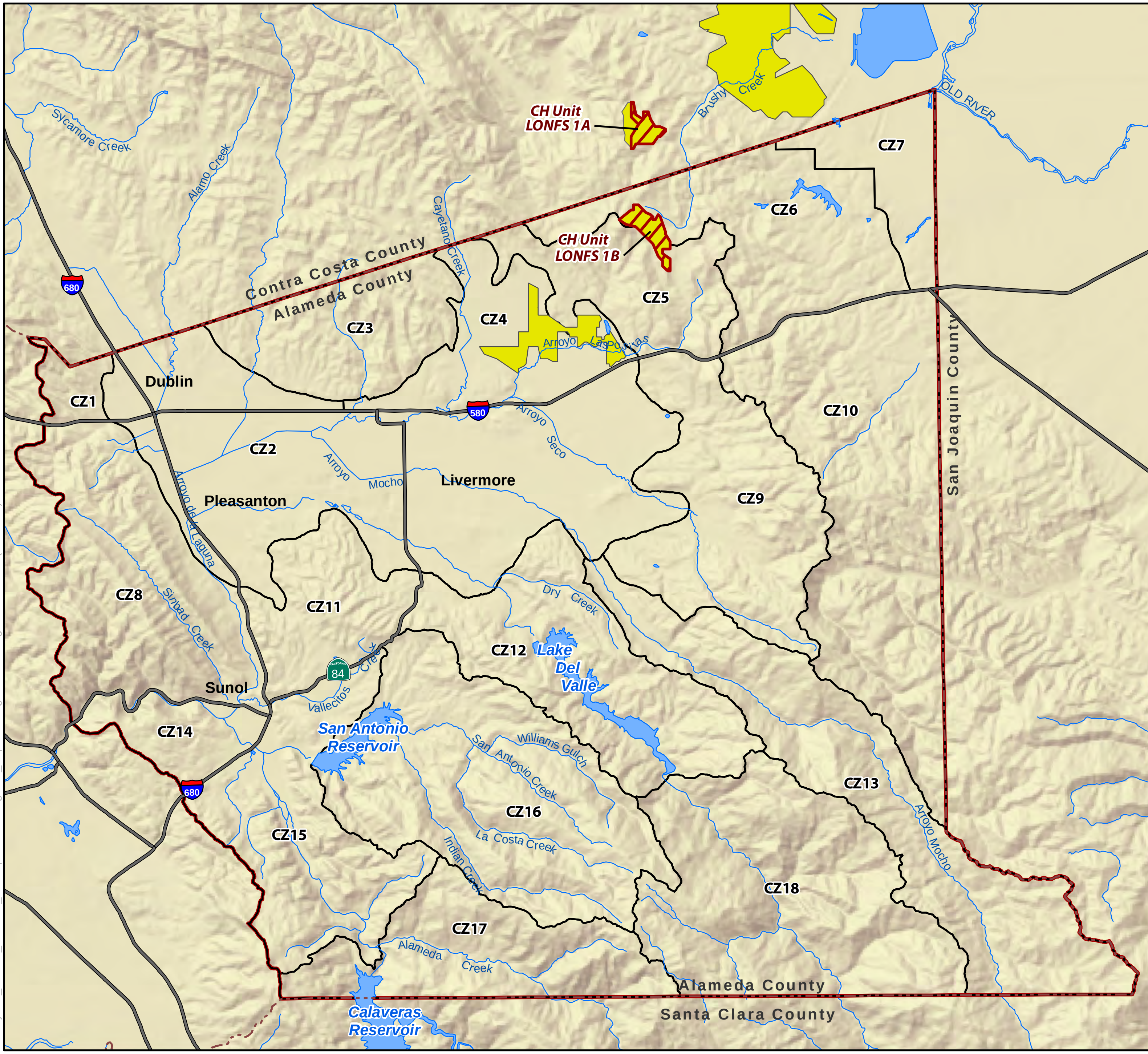
Study Area Boundary
Conservation Zones
Critical Habitat
Highways
Streams
Reservoirs
Vernal Pool Recovery Unit: Altamont Hills

Source: California Spatial Information Library; FR listing and critical habitat documents.

0 1 2 4
Miles

Figure 3-7
Longhorn Fairy Shrimp Standardized Mitigation Reference Map

October 2010



Study Area Boundary
Conservation Zones
Critical Habitat
Highways
Streams
Vernal Pool Recovery Unit: Altamont Hills

Source: California Spatial Information Library; FR listing and critical habitat documents.

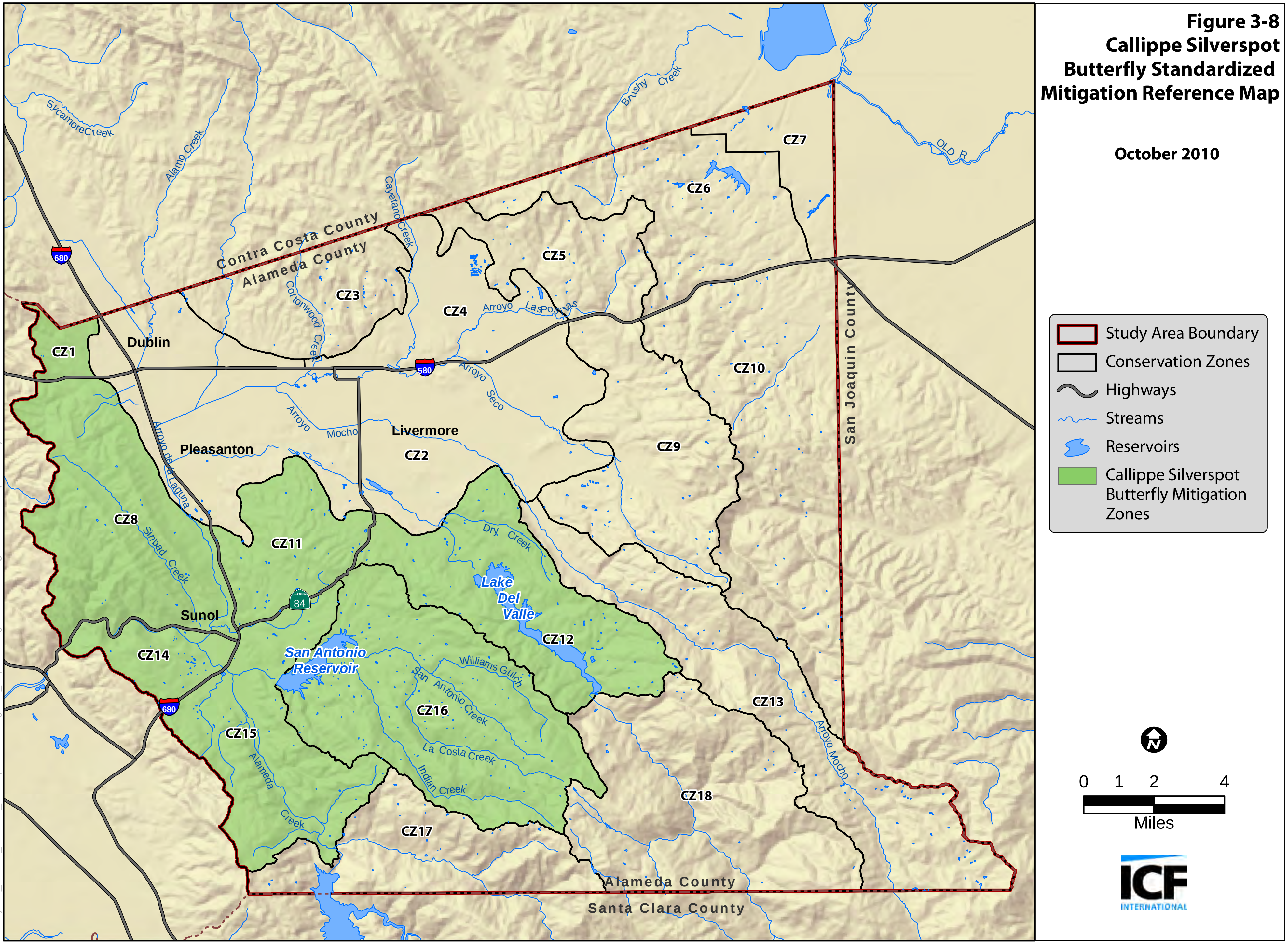
0 1 2 4
Miles

ICF INTERNATIONAL

K:\Projects_2\Zone_7\00029_07\mapdoc\FinalFigures_Sep2010\Fig 3-7 LFSMitigation.mxd MF (09-13-10)

Figure 3-8
Callippe Silverspot Butterfly Standardized Mitigation Reference Map

October 2010



K:\Projects_2\Zone_7\00029_07\mapdoc\FinalFigures_Sep2010\Fig 3-8 CSSBMitigation.mxd MF (09-13-10)

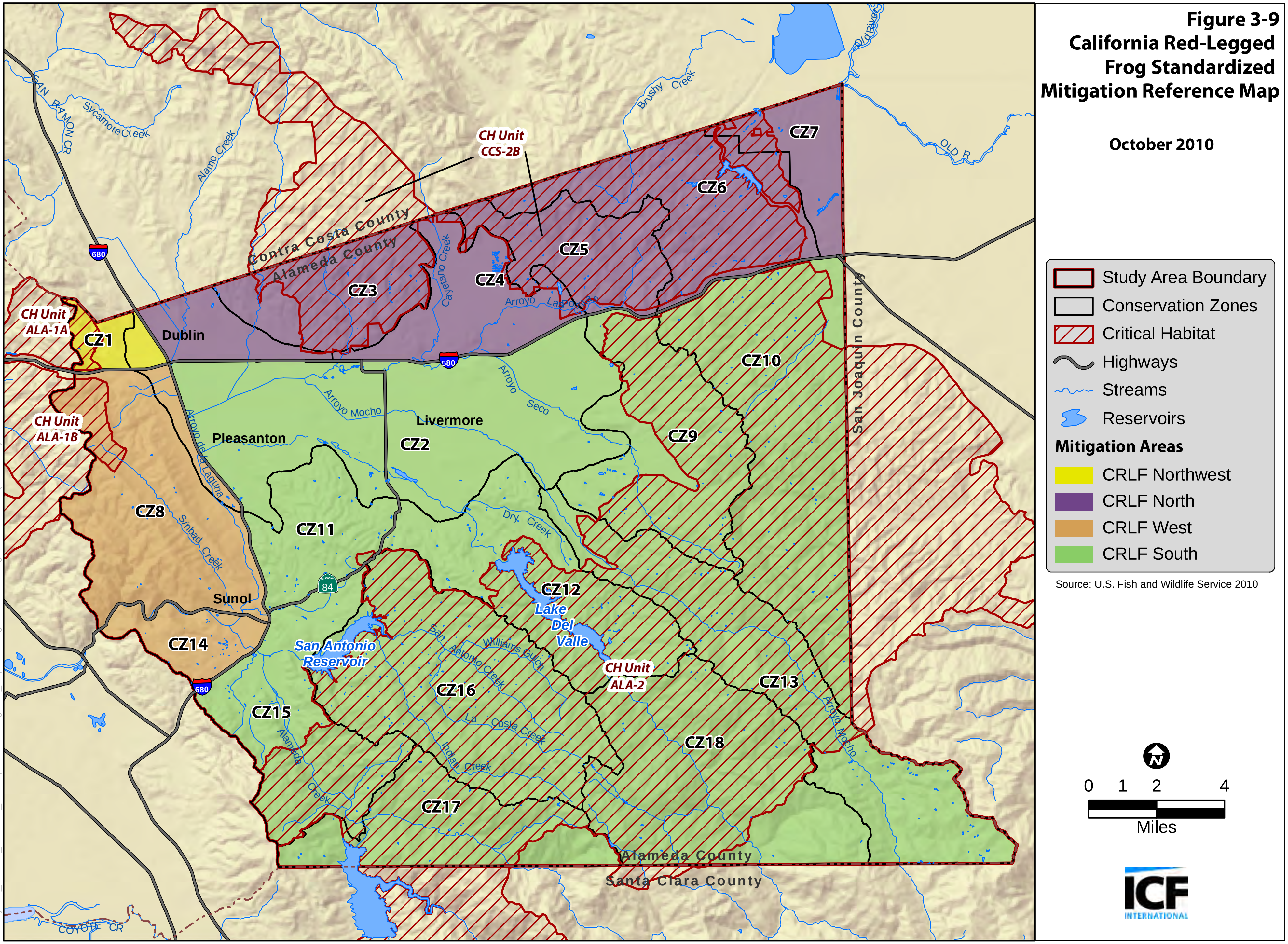


Figure 3-9 California Red-Legged Frog Standardized Mitigation Reference Map

K:\Projects_2\Zone_7\00029_07\mapdoc\FinalFigures_Sep2010\Fig 3-9 CRLFMitigation.mxd MF (09-13-10)

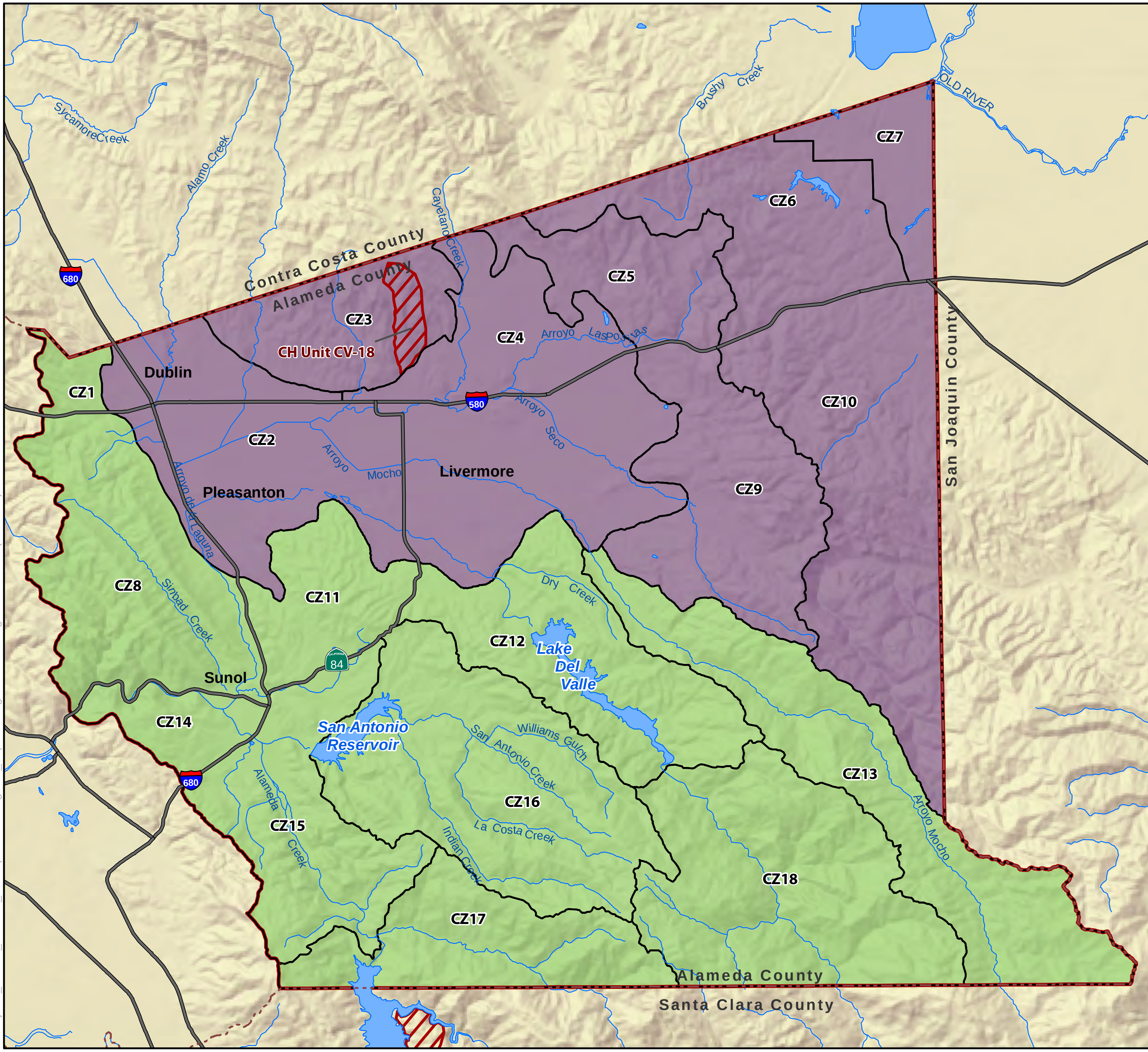


Figure 3-10
California Tiger Salamander Standardized Mitigation Reference Map

October 2010

Source: California Spatial Information Library; FR listing and critical habitat documents; California Gap Analysis, University of California Santa Barbara 1998.

Note: See Chapter 3 for explanation of Mitigation Areas.

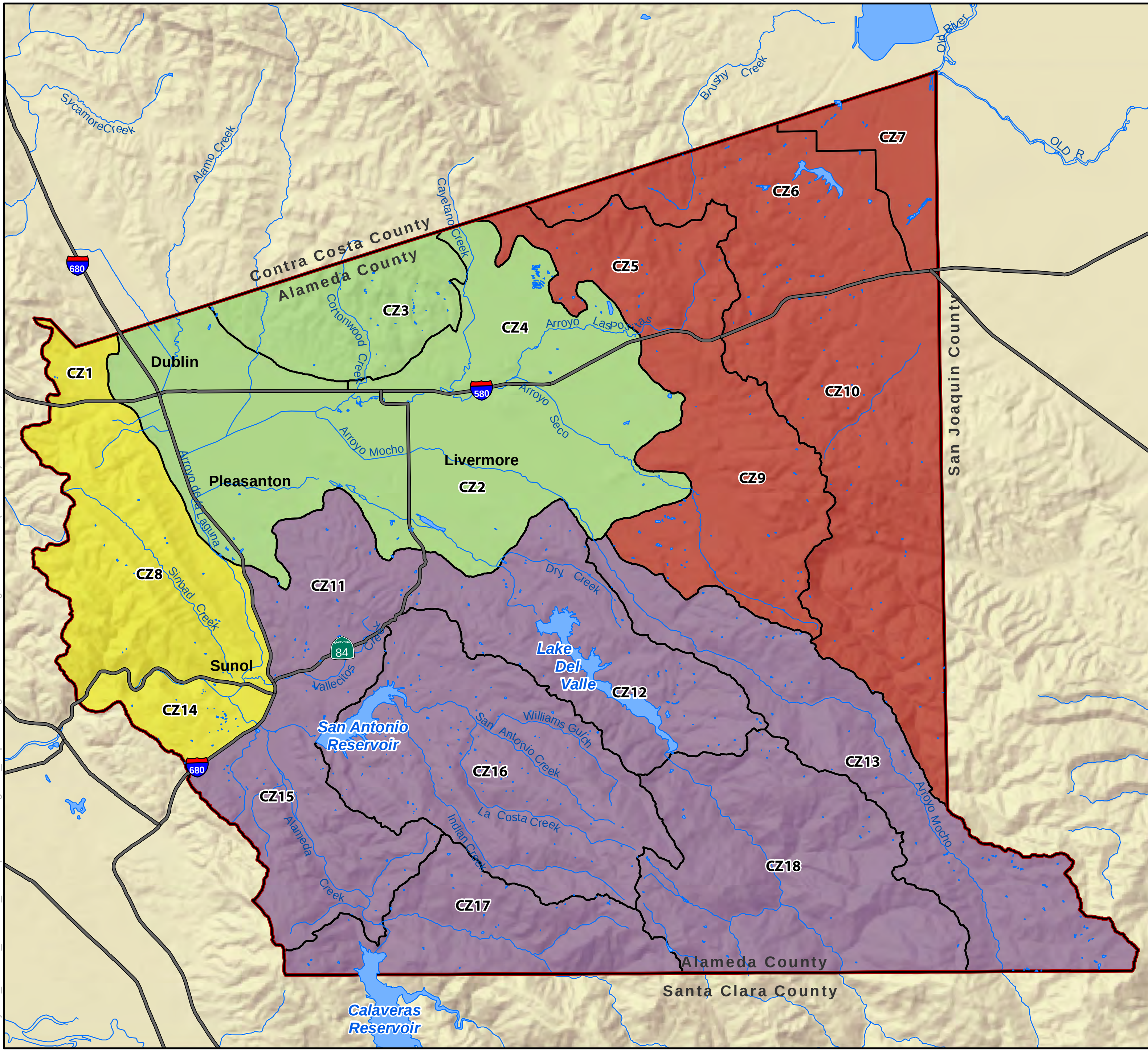
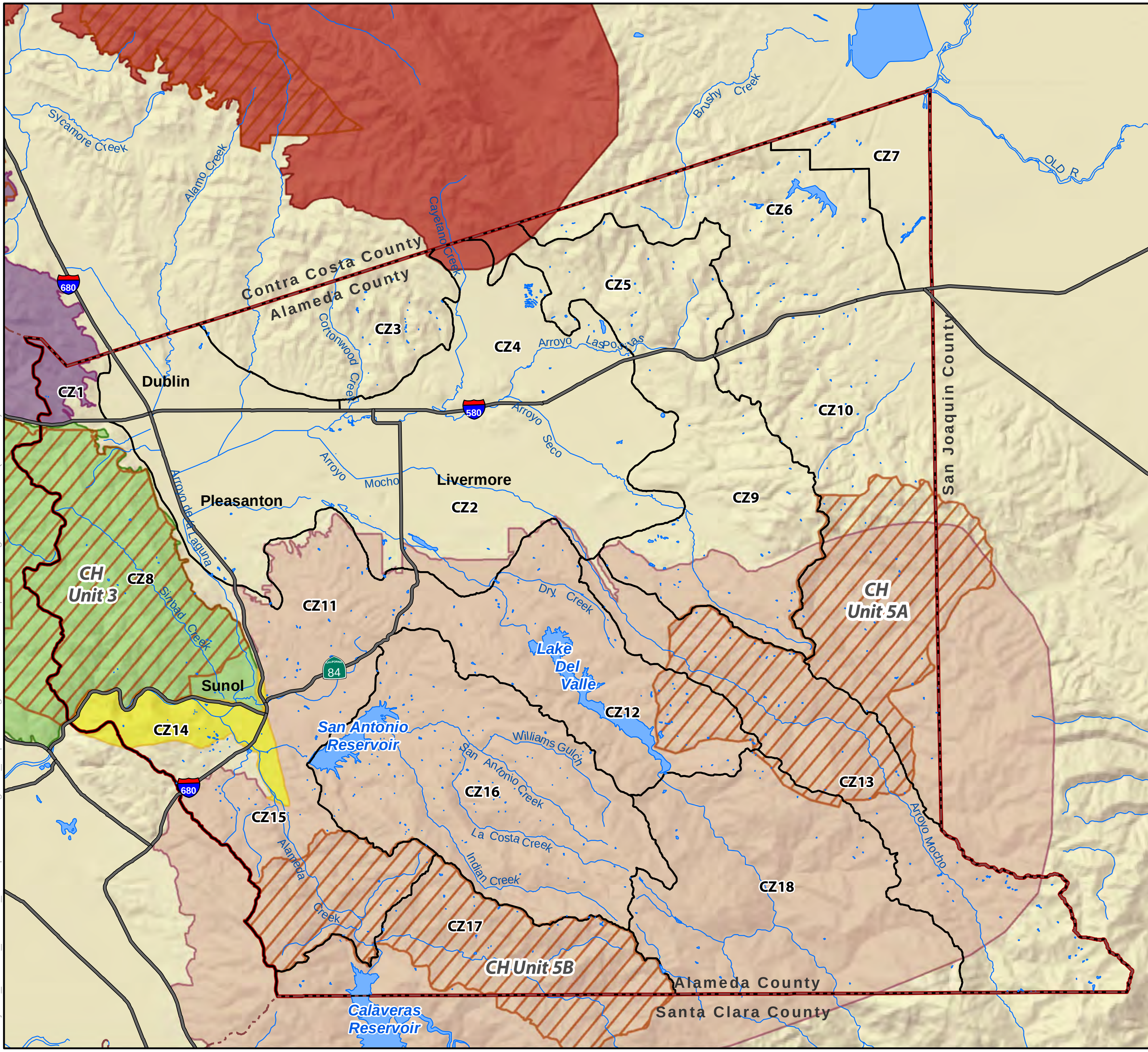


Figure 3-11
Plants and Non-listed Wildlife Species Standardized Mitigation Reference Map

October 2010

Figure 3-12
Alameda Whipsnake Standardized Mitigation Reference Map

October 2010



Study Area Boundary
Conservation Zones
Critical Habitat
Highways
Streams

USFWS Recovery Units

Unit 2
Unit 3
Unit 4
Unit 5
Unit 7

Source:
California Spatial Information Library.
U.S. Fish and Wildlife Service, 2002.
USFWS Recovery Plan

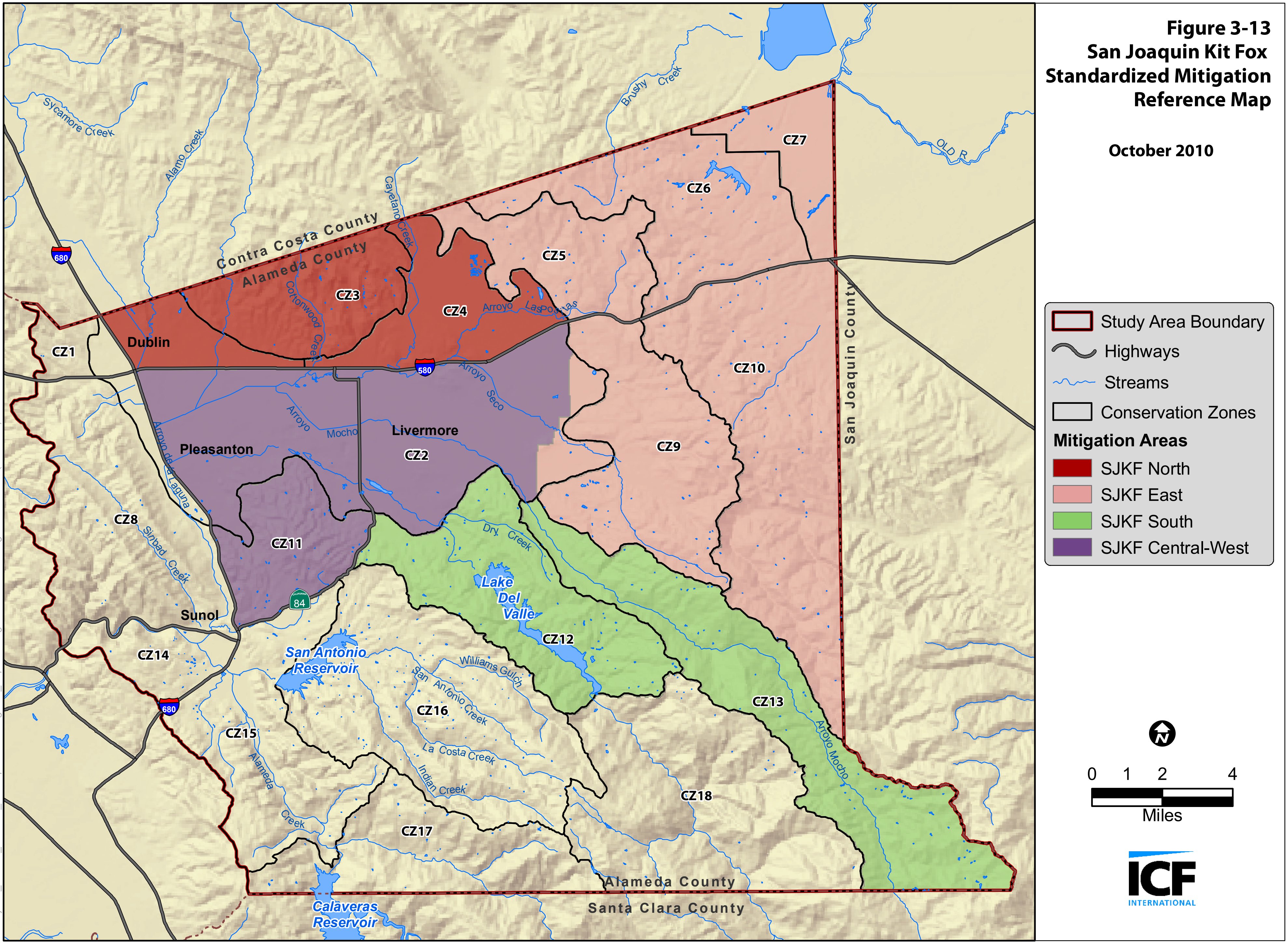
0 1 2 4
Miles

ICF INTERNATIONAL

K:\Projects_2\Zone_7\00029_07\mapdoc\FinalFigures_Sep2010\Fig 3-12 AlamedaWhipsnakeMitigation.mxd MF (09-13-10)

Figure 3-13
San Joaquin Kit Fox Standardized Mitigation Reference Map

October 2010



ICF INTERNATIONAL

K:\Projects_2\Zone_7\00029_07\mapdoc\FinalFigures_Sep2010\Fig 3-13 SJKitFoxMitigation.mxd MF (09-13-10)

Appendix C3

An Example Resource Equivalency Analysis for a Typical Wind Energy Project in the Altamont Pass Wind Resource Area, Alameda County

Appendix C3
An Example Resource Equivalency Analysis for a Typical Wind Energy Project in the Altamont Pass Wind Resource Area, Alameda County

Introduction

ICF International (ICF) developed this example Resource Equivalency Analysis (REA) as an approach to estimate quantitatively the amount of compensatory mitigation that is needed to mitigate impacts on raptors from windfarm operations. The REA is based on the approach used by the U.S. Fish and Wildlife Service (USFWS) to evaluate the mitigation requirements for golden eagles (U.S. Fish and Wildlife Service 2013). In this paper we provide background information on the REA process, methods, results, and conclusion for a sample wind project in the Altamont Pass Wind Resource Area (APWRA). USFWS's REA is based on a modeling approach used in natural resource damage assessment as a way to ensure that environmental impacts are mitigated, and as a tool to account for environmental debits and credits with respect to fatalities and mitigation. Additional information on USFWS's model can be found in *Eagle Conservation Plan Guidance* [ECP Guidance], *Appendix G. Examples Using Resource Equivalency Analysis to Estimate Compensatory Mitigation for the Take of Golden and Bald Eagles from Wind Energy Development* (U.S. Fish and Wildlife Service 2013).

Resource Equivalency Analysis Background

REA is a method of determining compensation using non-monetary metrics. REA, habitat equivalency analysis, habitat evaluation procedures, and other quantitative tools have been used for years to evaluate ways to mitigate environmental impacts and select among various preferred mitigation alternatives. REAs were first used in the late 1990s for an oil-spill Natural Resource Damage Assessment (NRDA) case on the North Cape of Rhode Island (Sperduto et al. 1999, 2003). They have subsequently been used for a variety of other resources, including resources as varied as marbled murrelets and coral reefs. The use of REAs is consistent with the Comprehensive Environmental Response, Compensation, and Liability Act; the Oil Pollution Act; and California's Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (Government Code Section 8670 et seq.). These regulations authorize trustee agencies to seek monetary compensation for injured natural resources (National Oceanic and Atmospheric Administration 1995). REA has also been internationally adopted by the European Union for addressing a full range of environmental liabilities (Cole & Kriström 2008).

A recent opinion paper by Cole (2011) advocates the use of REA as a method to specify appropriate types and amounts of compensation at windfarms. Additionally, USFWS recently provided REA examples in its ECP Guidance (U.S. Fish and Wildlife Service 2013:Appendix G) to illustrate the calculation of compensatory mitigation for the annual loss of bald and golden eagles caused by windfarm operations. USFWS's REA model is provided in a spreadsheet format. Inputs to the model include maximum lifespan, age of first reproduction, number of years females reproduce, productivity, age distribution of birds killed, productivity of mitigation, and a discount rate (i.e., the rate used in calculating the present value of expected yearly benefits and costs – 3%). This information is used to calculate direct losses, indirect losses, generational impacts, debits, productivity of mitigation, and credits owed. Based on these inputs, the model calculates the total debit in bird-years[1] associated with a specific timeframe. Additionally, USFWS's REA example notes that the REA metric of bird-years lends itself to consideration of other compensatory mitigation options, and implies that with enough reliable information, any compensatory mitigation that directly leads to an increased number of birds could be considered for compensation within the context of the REA (U.S. Fish and Wildlife Service 2013:Appendix G). The result of the REA is a comparison of the debit in bird years from the impact with the suggested benefit in bird years from the mitigation (i.e., the model demonstrates that the debits and the credits are equal).

Methods

We adjusted USFWS's golden eagle REA to include information specific to red-tailed hawks, burrowing owls, and American kestrels. These species were selected because they have been identified as *focal species* by Alameda County and other parties for the purposes of managing raptor impacts in the APWRA. The general rationale for using these species as focal species is that they are susceptible to turbine-related fatalities in significant numbers and they occupy ecological niches similar to those of many of the raptors in the region; consequently, management for these focal species could be expected to have benefits for other raptors and other migratory birds. The inputs used in the red-tailed hawk REA are listed in Table 1, the inputs used in the burrowing owl REA are listed in Table 2, and the inputs used in the American kestrel REA are listed in Table 3.

Table 1. REA Inputs to Develop a Framework of Compensatory Mitigation for Potential Take of Red-Tailed Hawk (RTHA) from Wind Energy Development in the APWRA

Parameter	REA Input	Reference
Start year	2015	Start of impact; expected to be 2015 for repowering program.
Estimated take (per year)	22	Estimated in PEIR based on Vasco monitoring results. Estimate to be adjusted in subsequent years following monitoring under Mitigation Measure BIO-11g. Estimate provided is for a "typical" 80 MW project such as Golden Hills.
Average maximum lifespan	25	Preston and Beane 2009.
Age distribution of birds killed at wind facilities (based on age distribution of RTHA population)	0–1=30% 1–4=45% 4+=25%	Preston and Beane 2009.
Age start reproducing	2+(age class 2–3)	Preston and Beane 2009.

[1] A *bird-year* refers to all ecological services provided by one bird for 1 year.

Parameter	REA Input	Reference
Expected years of reproduction	23	Years of reproduction is based on the maximum lifespan minus the age at which RTHA starts reproducing. Preston and Beane 2009.
% of adult females that reproduce annually	84%	Preston and Beane 2009.
Productivity (mean number of individuals fledged per occupied nest annually)	1.4	Preston and Beane 2009. Productivity varies across the country; several values are 1.4, including productivity in Montana. A CDFW study of the Los Banos Wildlife Area in California showed productivity of 2.1 (Schaap 2007).
Year 0–1 survival	61%	Estimated from literature.
Year 1–2 survival	79%	Estimated from literature.
Year 2–3 survival	79%	Estimated from literature.
Year 3–4 survival	79%	Estimated from literature.
Year 4+ survival	90.90%	Estimated from literature.
Relative productivity of mitigation (conservation and enhancement of lands resulting in additional survivorship)	0.10 birds/acre/year	Estimated as described below.
Number of years of avoided loss from mitigation	30	Requirement under MM BIO-11h is that conservation lands would be preserved in perpetuity. A 30-year conservation benefit is assumed.
Discount rate	3%	A 3% discount rate is commonly used for valuing lost natural resource services (Lind 1982; Freeman 1993; National Oceanic and Atmospheric Administration 1999; court decisions on NRDA cases).

Table 2. REA Inputs to Develop a Framework of Compensatory Mitigation for Potential Take of Burrowing Owl (BUOW) from Wind Energy Development in the APWRA

Parameter	REA Input	Reference
Start year	2015	Start of impact; expected to be 2015 for repowering program.
Estimated take (per year)	5	Estimated in PEIR based on Vasco monitoring results. Estimate to be adjusted in subsequent years following monitoring under Mitigation Measure BIO-11g. Estimate provided is for a “typical” 80 MW project such as Golden Hills. Estimate rounded up from 4.4.
Maximum lifespan	8	Poulin et al. 2011. Longevity record based on banding data is 8 years.

Parameter	REA Input	Reference
Age distribution of birds killed at wind facilities (based on age distribution of BUOW population)	0–1=50% 1+=50%	Unknown. An even age distribution of juveniles and adults was assumed.
Age start reproducing	1	Poulin et al. 2011 (actual is 10 months).
Expected years of reproduction	7	Years of reproduction is based on the maximum lifespan minus the age at which BUOW starts reproducing. Poulin et al. 2011.
% of adult females that reproduce annually	100%	Unknown. Assumed all adult females breed annually.
Productivity (mean number of individuals fledged per occupied nest annually)	4.5	Poulin et al. 2011. Productivity varies across country from 1.6 to 7.4. Selected median of 4.5.
Year 0–1 survival	30%	Poulin et al. 2011 notes 30% survival rate for juveniles in southern California.
Year 1–2 survival	81%	Poulin et al. 2011 notes 81% survival rate for adults in southern California.
Year 2–3 survival	81%	Poulin et al. 2011 notes 81% survival rate for adults in southern California.
Year 3–4 survival	81%	Poulin et al. 2011 notes 81 % survival rate for adults in southern California.
Year 4+ survival	81%	Poulin et al. 2011 notes 81 % survival rate for adults in southern California.
Relative productivity of mitigation (conservation and enhancement of lands resulting in additional survivorship)	0.10 birds/acre/year	Estimated as described below.
Number of years of avoided loss from mitigation	30	Requirement under MM BIO-11h is that conservation lands would be preserved in perpetuity. A 30-year conservation benefit is assumed.
Discount rate	3%	A 3% discount rate is commonly used for valuing lost natural resource services (Lind 1982; Freeman 1993; National Oceanic and Atmospheric Administration 1999; court decisions on NRDA cases).

Table 3. REA Inputs to Develop a Framework of Compensatory Mitigation for Potential Take of American Kestrel (AMKE) from Wind Energy Development in the APWRA

Parameter	REA Input	Reference
Start year	2015	Start of impact; expected to be 2015 for repowering program.
Estimated take (per year)	26	Estimated in PEIR based on Vasco monitoring results. Estimate to be adjusted in subsequent years following monitoring under Mitigation Measure BIO-11g. Estimate provided is for a "typical" 80 MW project such as Golden Hills. Estimate rounded from 26.3.
Average maximum lifespan	11	Smallwood and Bird 2002.
Age distribution of birds killed at wind facilities	0–1=57% 2–11=43%	Calculated proportion of population in each age class from survival rates and assumed they would be killed in proportion to availability.
Age start reproducing	1	Smallwood and Bird 2002.
Expected years of reproduction	10	Years of reproduction is based on the maximum lifespan minus the age at which BUOW starts reproducing. Smallwood and Bird 2002.
% of adult females that reproduce annually	80%	Estimated.
Productivity (mean number of individuals fledged per occupied nest annually)	3.1	Smallwood and Bird 2002.
Year 0–1 survival	62.9%	Smallwood and Bird 2002.
Year 1–2 survival	57.1%	Smallwood and Bird 2002.
Year 2–3 survival	57.1%	Smallwood and Bird 2002.
Year 3–4 survival	57.1%	Smallwood and Bird 2002.
Year 4+ survival	57.1%	Smallwood and Bird 2002.
Relative productivity of mitigation (conservation and enhancement of lands resulting in additional survivorship)	0.10 birds/acre/year	Estimated as described below.
Number of years of avoided loss from mitigation	30	Requirement under MM BIO-11h is that conservation lands would be preserved in perpetuity. A 30-year conservation benefit is assumed.
Discount rate	3%	A 3% discount rate is commonly used for valuing lost natural resource services (Lind 1982; Freeman 1993; National Oceanic and Atmospheric Administration 1999; court decisions on NRDA cases).

In addition to the life history factors, the key assumptions related to the REA are (1) the expected annual fatalities, (2) the relative benefits of the mitigation, (3) the years of benefit/avoided loss from the mitigation, (4) the start year of the fatalities, and (5) the start year of the mitigation. The expected fatality rate was determined using the methods described in the PEIR, based on the expected rate of red-tailed hawk, burrowing owl, and American kestrel fatalities (birds/MW/year) observed at the Vasco winds project site, extrapolated to a typical 80 MW project.

The relative benefits of the mitigation were estimated by assuming that survival benefits arise from the management of conservation lands, including the removal of rodenticide, eliminating the killing of ground squirrels with lead shot, increasing prey abundance, and other management factors that increase the survival of the focal species. As ground squirrel density and availability is a key element of raptor survivorship and therefore productivity, greater numbers of ground squirrels would be expected to benefit individuals. Additionally, raptors are known to die from secondary poisoning after consuming vertebrate prey that has ingested rodenticides (Mineau et al. 1999); consequently, eliminating toxins will also increase survival. Considering these factors, we assumed that these management actions and the conservation of lands would result in a productivity increase (resulting in additional RTHA, BUOW, and AMKE in the environment) of 0.1bird per acre of habitat managed. Such quantification is difficult based on the currently available scientific literature; however, we believe these assumptions to be reasonable metrics that could be updated as new information becomes available in the future.

The period over which the mitigation would provide benefits was assigned a 30-year duration. Although the conserved lands would be preserved in perpetuity, the duration of the average life of a wind project was assigned to the duration of mitigation.

Finally, to simplify the example and the interpretation of the results, and considering that projects would be phased over time under the repowering program, the start year of the fatalities and the start year of the mitigation were considered to be the same: 2015.

ICF modified the USFWS golden eagle REA model to approximate the life-history information associated with RTHA, BUOW, and AMKE as described above. In this process we used the variable *acres* needed to result in increased productivity rather than showing the unit of benefit in terms of *poles* retrofitted to result in avoided fatalities and/or loss of productivity.

Results

The results from the red-tailed hawk REA using the inputs described above determine the total lost bird-years from the expected impact (Table 4) and the relative productivity of the mitigation (Table 5). These metrics are used to calculate the compensatory mitigation requirement as shown in Table 6. This calculation endeavors to ensure that the compensatory mitigation provides a credit that is equal to the debit for the expected take.

Table 4. Total Lost Bird-Years

	PV[2] Bird-Years		
Year	RTHA	BUOW	AMKE
2015	131.47	13.06	40.14
2016	127.64	12.68	38.97
2017	123.93	12.31	37.84
2018	120.32	11.95	36.74
2019	116.81	11.60	35.67
2020	113.41	11.26	34.63
2021	110.10	10.93	33.62
2022	106.90	10.62	32.64
2023	103.78	10.31	31.69
2024	100.76	10.01	30.77
Total PV Bird-Years	1,155.12	114.71	352.70

Table 5. Relative Productivity of Conserving/Enhancing 1 Acre

	PV Bird-Years/Conserved Acre		
Year	RTHA	BUOW	AMKE
2015	0.598	0.178	0.154
2016	0.580	0.173	0.150
2017	0.563	0.168	0.146
2018	0.547	0.163	0.141
2019	0.531	0.158	0.137
2020	0.515	0.153	0.133
2021	0.500	0.149	0.129
2022	0.486	0.145	0.126
2023	0.472	0.140	0.122
2024	0.458	0.136	0.118
2025	0.445	0.132	0.115
2026	0.432	0.128	0.112
2027	0.419	0.125	0.108
2028	0.407	0.121	0.105
2029	0.395	0.118	0.102
2030	0.384	0.114	0.099
2031	0.372	0.111	0.096
2032	0.362	0.108	0.093
2033	0.351	0.104	0.091

[2] PV = Present Value- within the context of a Resource Equivalency Analysis (REA), refers to the value of debits and credits based on an assumed annual discount rate (3%). This term is commonly used in economics and implies that resources lost or gained in the future are of less value to us today.

	PV Bird-Years/Conserved Acre		
Year	RTHA	BUOW	AMKE
2034	0.341	0.101	0.088
2035	0.331	0.098	0.085
2036	0.321	0.096	0.083
2037	0.312	0.093	0.081
2038	0.303	0.090	0.078
2039	0.294	0.087	0.076
2040	0.285	0.085	0.074
2041	0.277	0.082	0.072
2042	0.269	0.080	0.070
2043	0.261	0.078	0.067
2044	0.254	0.075	0.066
Total PV Bird-Years	12.064	3.589	3.117

Table 6. Credit Owed for a 10-year Take

	RTHA	BUOW	AMKE	
Total Debit	1,155.12	114.71	352.70	PV Bird-Years
÷ Relative Productivity of Conservation of 1 Acre	12.06	3.59	3.12	Avoided loss of PV bird-years/acre
= Credit owed	95.78	31.96	113.04	Acres to be conserved

The REA for red-tailed hawk indicates that approximately 96 acres of conserved lands (preserved for at least 30 years), managed for red-tailed hawks, would be required to compensate for the loss from 10 years of estimated take (22 birds/year) from a typical 80 MW wind project.

The REA for burrowing owl indicates that approximately 32 acres of conserved lands (preserved for at least 30 years), managed for burrowing owl, would be required to compensate for the loss from 10 years of estimated take (5 birds/year) from a typical 80 MW wind project.

The REA for American kestrel indicates that approximately 113 acres of conserved lands (preserved for at least 30 years), managed for American kestrel, would be required to compensate for the loss from 10 years of estimated take (26 birds/year) from a typical 80 MW wind project.

Detailed calculations are provided in REA spreadsheet models, available for review from Alameda County.

Conclusions

This analysis provides an empirical evaluation of the mitigation that is needed to offset impacts on red-tailed hawk, burrowing owl, and American kestrel using the REA process; however, it should be noted that a variety of assumptions and variable life history information can substantively influence the results provided by the worksheets. Similarly, the expected benefits of the mitigation could vary depending on the specific conditions of the mitigation site. This REA example is intended to be used as a framework, guide, and planning tool for the County and applicants to estimate compensatory mitigation for specific projects. Under this approach, each applicant would input the estimated number of fatalities expected annually to calculate the mitigation needed for that species. If an applicant believes there is additional or more current literature that should be cited, the life history and ecological information could also be updated.

Assuming that a single mitigation site could provide resource values for red-tailed hawk, western burrowing owl, and American kestrel (given that all three species forage, breed, and winter in the region), a single mitigation site of 113 acres could serve as mitigation for all three species. Therefore, in this example, an 80 MW project with projected fatalities of 22 (RTHA), 5 (BUOW) and 26 (MAKE) would require 113 acres of mitigation every 10 years.

References Cited

Cole, S. G. 2011. Wind Power Compensation Is Not for the Birds: an Opinion from an Environmental Economist. *Restoration Ecology*. 19:2. Available: http://dx.doi.org/10.1111/j.1526-100X.2010.00771.x.

Cole, S. G., and B. G. Kriström. 2008. Annex 5: *Discounting*. In: REMEDE Tookit (see Lipton et al. 2008). Available: http://www.envliability.eu/docs/D13MaintToolkit_and_Annexes/D13MainToolkit.html

Lind, R. 1982. A Primer on the Major Issues Relating to the Discount Rate for Evaluating National Energy Options. in R. Lind (ed), *Discounting for Time and Risk in Energy Policy*. Washington, DC: Resources for the Future.

Freeman, A. M. III. 1993. The Measurement of Environmental and Resource Values: Theory and Methods. Washington, DC: Resources for the Future.

Mineau, P., M. R. Fletcher, L. C. Glaser, N. J. Thomas, C. Brassard, L. K. Wilson, J. E. Elliott, L. A. Lyon, C. J. Henny, T. Bollinger, and S. L. Porter. 1999. Poisoning of Raptors with Organophosphorus and Carbamate Pesticides with Emphasis on Canada, US and UK. *Journal of Raptor Research* 33(1):1–37.

National Oceanic and Atmospheric Administration. 1999. Discounting and the Treatment of Uncertainty in Natural Resource Damage Assessment. Technical Paper 99-1. Silver Spring, MD.

National Oceanic and Atmospheric Administration. 1995. *Habitat Equivalency Analysis: An Overview*. Damage Assessment and Restoration Program. March 21 (Revised October 4, 2000, and May 23, 2006).

Poulin, R., L. Danielle Todd, E. A. Haug, B. A. Millsap, and M. S. Martell. 2011. Burrowing Owl (*Athene cunicularia*). *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology.

Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/061doi:10.2173/bna.61

Preston, C. R., and R. D. Beane. 2009. Red-tailed Hawk (*Buteo jamaicensis*). *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/052doi:10.2173/bna.52

Schaap, M. 2007. Raptor Nest Monitoring on the Los Banos Wildlife Area Complex, 2006–2007. September. Final Report. Publication #34. Los Banos, CA: California Department of Fish and Game, Resource Assessment Program.

Smallwood, J. A., and D. M. Bird. 2002. American Kestrel (*Falco sparverius*). *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/602 doi:10.2173/bna.602

Sperduto, M.B., S.P. Powers., M. Donlan. 2003. Scaling Restoration to Achieve Quantitative Enhancement of Loon, Seaduck, and other Seabird Populations. *Marine Ecology Progress Series* 264:221–232.

U.S. Fish and Wildlife Service. 2013. *Eagle Conservation Plan Guidance. Module 1- Land-based Wind Energy Version 2*. April.

Appendix D
Noise Data

APWRA

Construction Noise Summary

Construction Phase	Lmax (dBA) at Various Distance from Construction Site (feet)								Leq (dBA) at Various Distance from Construction Site (feet)							
	50	100	200	400	800	1,600	3,200	6,400	50	100	200	400	800	1,600	3,200	6,400
Phase 1 - Decommissioning & Foundation Removal	88	80	72	63	55	46	35	21	83	75	67	59	50	41	30	17
Phase 2 - Laydown, Substations and Switch Yards	89	81	73	65	56	47	36	23	85	76	68	60	51	42	31	18
Phase 3 - Road Construction	91	83	75	66	58	49	38	24	87	79	71	62	54	44	34	20
Phase 4 - WTG Foundations & Batch Plant	95	87	79	71	62	53	42	29	86	78	70	61	53	43	33	19
Phase 5 - WTG Delivery & Installation	84	76	68	60	51	42	31	18	79	71	63	55	46	37	26	12
Phase 6 - Utility Collector Line Installation	86	78	70	61	53	43	33	19	81	73	65	57	48	39	28	15
Phase 7 - Cleanup & Restoration	86	78	70	62	53	44	33	20	82	74	66	58	49	40	29	16

Construction Phase	Distance (feet) to Various Noise Level (dBA)			
	Lmax		Leq	
	70	65	50	45
Phase 1 - Decommissioning & Foundation Removal	235	347	822	1,105
Phase 2 - Laydown, Substations and Switch Yards	261	385	910	1,224
Phase 3 - Road Construction	289	458	1,132	1,522
Phase 4 - WTG Foundations & Batch Plant	436	624	1,033	1,389
Phase 5 - WTG Delivery & Installation	169	268	547	867
Phase 6 - Utility Collector Line Installation	191	283	677	1,074
Phase 7 - Cleanup & Restoration	204	301	750	1,188

APWRA

Construction Phase: Decommissioning & Foundation Removal

Noise-Generating Construction Equipment

Equipment Type	Individual Equipment SPL Lmax at 50 ft	Individual Equipment Acoustic Usage Factor	Combined Equipment No.of Pieces	Combined Equipment SPL Lmax at 50 ft	Combined Equipment SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16	1	81	73.0
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40	1	76	72.0
Excavator	81	0.40	1	81	77.0
Flat Bed Truck	74	0.40	1	74	70.0
Front End Loader	79	0.40			
Generator	81	0.50			
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40	1	85	81.0
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	**--**	**--**	**5**	**88.0**	**83.5**

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA
Anomalous Excess Attenuation	0.001	dBA
Ground Type (soft or hard)	soft	
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet
FTA Ground Attenuation Factor G	0.643	dBA

Distance from Construction Site (feet)	Noise Level with Attenuation: Outdoor Leq	Noise Level with Attenuation: Outdoor Lmax	Noise Level with Barrier (Levees): Noise Reduction	Noise Level with Barrier (Levees): Outdoor Leq
100	75	80	0	75
200	67	72	0	67
400	59	63	0	59
800	50	55	0	50
1,600	41	46	0	41
3,200	30	35	0	30
6,400	17	21	0	17

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.
Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

APWRA

Construction Phase: Laydown Yards Substations and Switch Yards

Noise-Generating Construction Equipment

Equipment Type	Individual Equipment: SPL Lmax at 50 ft	Individual Equipment: Acoustic Usage Factor	Combined Equipment: No.of Pieces	Combined Equipment: SPL Lmax at 50 ft	Combined Equipment: SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20	1	83	76.0
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40	1	82	78.0
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40	1	76	72.0
Excavator	81	0.40			
Flat Bed Truck	74	0.40	1	74	70.0
Front End Loader	79	0.40	1	79	75.0
Generator	81	0.50			
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40	1	85	81.0
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	**--**	**--**	**6**	**89.1**	**84.6**

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA
Anomalous Excess Attenuation	0.001	dBA
Ground Type (soft or hard)	soft	
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet
FTA Ground Attenuation Factor G	0.643	dBA

Distance from Construction Site (feet)	Noise Level with Attenuation: Outdoor Leq	Noise Level with Attenuation: Outdoor Lmax	Noise Level with Barrier (Levees): Noise Reduction	Noise Level with Barrier (Levees): Outdoor Leq
100	76	81	0	76
200	68	73	0	68
400	60	65	0	60
800	51	56	0	51
1,600	42	47	0	42
3,200	31	36	0	31
6,400	18	23	0	18

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.
Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

APWRA

Construction Phase: Road Construction

Noise-Generating Construction Equipment

	Individual Equipment		Combined Equipment		
Equipment Type	SPL Lmax at 50 ft	Acoustic Usage Factor	No.of Pieces	SPL Lmax at 50 ft	SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50	1	85	82.0
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20	1	83	76.0
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40	1	82	78.0
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40	1	76	72.0
Excavator	81	0.40	1	81	77.0
Flat Bed Truck	74	0.40	1	74	70.0
Front End Loader	79	0.40	1	79	75.0
Generator	81	0.50			
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40	1	85	81.0
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	**--**	**--**	**8**	**91.0**	**87.0**

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA
Anomalous Excess Attenuation	0.001	dBA
Ground Type (soft or hard)	soft	
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet
FTA Ground Attenuation Factor G	0.643	dBA

	Noise Level with Attenuation		Noise Level with Barrier (Levees)	
Distance from Construction Site (feet)	Outdoor Leq	Outdoor Lmax	Noise Reduction	Outdoor Leq
100	79	83	0	79
200	71	75	0	71
400	62	66	0	62
800	54	58	0	54
1,600	44	49	0	44
3,200	34	38	0	34
6,400	20	24	0	20

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.
Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

APWRA

Construction Phase: WTG Foundations and Batch Plant

Noise-Generating Construction Equipment

Equipment Type	Individual Equipment SPL Lmax at 50 ft	Individual Equipment Acoustic Usage Factor	Combined Equipment No.of Pieces	Combined Equipment SPL Lmax at 50 ft	Combined Equipment SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01	1	94	74.0
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20	1	83	76.0
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40	1	79	75.0
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40	1	82	78.0
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40	1	76	72.0
Excavator	81	0.40	1	81	77.0
Flat Bed Truck	74	0.40	1	74	70.0
Front End Loader	79	0.40	1	79	75.0
Generator	81	0.50			
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40	1	85	81.0
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	**--**	**--**	**9**	**95.5**	**86.0**

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA
Anomalous Excess Attenuation	0.001	dBA
Ground Type (soft or hard)	soft	
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet
FTA Ground Attenuation Factor G	0.643	dBA

Distance from Construction Site (feet)	Noise Level with Attenuation: Outdoor Leq	Noise Level with Attenuation: Outdoor Lmax	Noise Level with Barrier (Levees): Noise Reduction	Noise Level with Barrier (Levees): Outdoor Leq
100	78	87	0	78
200	70	79	0	70
400	61	71	0	61
800	53	62	0	53
1,600	43	53	0	43
3,200	33	42	0	33
6,400	19	29	0	19

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.
Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

APWRA

Construction Phase: WTG Delivery & Installation

Noise-Generating Construction Equipment

Equipment Type	Individual Equipment: SPL Lmax at 50 ft	Individual Equipment: Acoustic Usage Factor	Combined Equipment: No.of Pieces	Combined Equipment: SPL Lmax at 50 ft	Combined Equipment: SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16	1	81	73.0
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40			
Excavator	81	0.40	1	81	77.0
Flat Bed Truck	74	0.40	1	74	70.0
Front End Loader	79	0.40			
Generator	81	0.50			
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40			
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	**--**	**--**	**3**	**84.4**	**79.1**

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA
Anomalous Excess Attenuation	0.001	dBA
Ground Type (soft or hard)	soft	
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet
FTA Ground Attenuation Factor G	0.643	dBA

Distance from Construction Site (feet)	Noise Level with Attenuation: Outdoor Leq	Noise Level with Attenuation: Outdoor Lmax	Noise Level with Barrier (Levees): Noise Reduction	Noise Level with Barrier (Levees): Outdoor Leq
100	71	76	0	71
200	63	68	0	63
400	55	60	0	55
800	46	51	0	46
1,600	37	42	0	37
3,200	26	31	0	26
6,400	12	18	0	12

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.
Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

APWRA

Construction Phase: Utility Collector Line Installation

Noise-Generating Construction Equipment

	Individual Equipment		Combined Equipment		
Equipment Type	**SPL Lmax at 50 ft**	**Acoustic Usage Factor**	**No.of Pieces**	**SPL Lmax at 50 ft**	**SPL Leq at 50 ft**
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40	1	76	72.0
Excavator	81	0.40			
Flat Bed Truck	74	0.40			
Front End Loader	79	0.40	1	79	75.0
Generator	81	0.50			
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40			
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25	1	82	76.0
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50	1	80	77.0
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	**--**	**--**	**4**	**85.8**	**81.4**

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA
Anomalous Excess Attenuation	0.001	dBA
Ground Type (soft or hard)	soft	
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet
FTA Ground Attenuation Factor G	0.643	dBA

	Noise Level with Attenuation		Noise Level with Barrier (Levees)	
Distance from Construction Site (feet)	**Outdoor Leq**	**Outdoor Lmax**	**Noise Reduction**	**Outdoor Leq**
100	73	78	0	73
200	65	70	0	65
400	57	61	0	57
800	48	53	0	48
1,600	39	43	0	39
3,200	28	33	0	28
6,400	15	19	0	15

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.
Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

APWRA

Construction Phase: Restoration and Clean up

Noise-Generating Construction Equipment

	Individual Equipment		Combined Equipment		
Equipment Type	**SPL Lmax at 50 ft**	**Acoustic Usage Factor**	**No.of Pieces**	**SPL Lmax at 50 ft**	**SPL Leq at 50 ft**
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16			
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40			
Excavator	81	0.40	1	81	77.0
Flat Bed Truck	74	0.40			
Front End Loader	79	0.40			
Generator	81	0.50			
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40	1	85	81.0
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	**--**	**--**	**2**	**86.5**	**82.5**

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA
Anomalous Excess Attenuation	0.001	dBA
Ground Type (soft or hard)	soft	
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet
FTA Ground Attenuation Factor G	0.643	dBA

	Noise Level with Attenuation		Noise Level with Barrier (Levees)	
Distance from Construction Site (feet)	**Outdoor Leq**	**Outdoor Lmax**	**Noise Reduction**	**Outdoor Leq**
100	74	78	0	74
200	66	70	0	66
400	58	62	0	58
800	49	53	0	49
1,600	40	44	0	40
3,200	29	33	0	29
6,400	16	20	0	16

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.
Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

APWRA

Operation Noise

Noise-Generating Construction Equipment

Equipment Type	Individual Equipment SPL Lmax at 50 ft	Individual Equipment Acoustic Usage Factor	Combined Equipment No.of Pieces	Combined Equipment SPL Lmax at 50 ft	Combined Equipment SPL Leq at 50 ft
All Other Equipment > 5 HP	85	0.50			
Auger Drill Rig	84	0.20			
Backhoe	78	0.40			
Bar Bender	80	0.20			
Blasting	94	0.01			
Boring Jack Power Unit	83	0.50			
Chain Saw	84	0.20			
Clam Shovel (dropping)	87	0.20			
Compactor (ground)	83	0.20			
Compressor (air)	78	0.40			
Concrete Batch Plant	83	0.15			
Concrete Mixer Truck	79	0.40			
Concrete Pump Truck	81	0.20			
Concrete Saw	90	0.20			
Crane	81	0.16	1	81	73.0
Dozer	82	0.40			
Drill Rig Truck	79	0.20			
Drum Mixer	80	0.50			
Dump Truck	76	0.40			
Excavator	81	0.40			
Flat Bed Truck	74	0.40	1	74	70.0
Front End Loader	79	0.40			
Generator	81	0.50	1	81	78.0
Generator (<25KVA, VMS signs)	73	0.50			
Gradall	83	0.40			
Grader	85	0.40	1	85	81.0
Grapple (on backhoe)	87	0.40			
Horizontal Boring Hydr. Jack	82	0.25			
Hydra Break Ram	90	0.10			
Impact Pile Driver	101	0.20			
Jackhammer	89	0.20			
Man Lift	75	0.20			
Mounted Impact Hammer (hoe ram)	90	0.20			
Pavement Scarafier	90	0.20			
Paver	77	0.50			
Pickup Truck	75	0.40			
Pneumatic Tools	85	0.50			
Pumps	81	0.50			
Refrigerator Unit	73	1.00			
Rivit Buster/chipping gun	79	0.20			
Rock Drill	81	0.20			
Roller	80	0.20			
Sand Blasting (Single Nozzle)	96	0.20			
Scraper	84	0.40			
Shears (on backhoe)	96	0.40			
Slurry Plant	78	1.00			
Slurry Trenching Machine	80	0.50			
Soil Mix Drill Rig	80	0.50			
Tractor	84	0.40			
Vacuum Excavator (Vac-truck)	85	0.40			
Vacuum Street Sweeper	82	0.10			
Ventilation Fan	79	1.00			
Vibrating Hopper	87	0.50			
Vibratory Concrete Mixer	80	0.20			
Vibratory Pile Driver	101	0.20			
Warning Horn	85	0.05			
Water Jet Deleading	83	0.20			
Welder / Torch	74	0.40			
COMBINED EQUIPMENT (SPL AT 50 FEET)	**--**	**--**	**4**	**87.7**	**83.4**

Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

Modeled Noise Levels at Varying Distances (Includes Hemispherical Spreading and Atmospheric Absorption)

Molecular Absorption	0.0007	dBA
Anomalous Excess Attenuation	0.001	dBA
Ground Type (soft or hard)	soft	
Equivalent Source-Receiver Height (Hs+Hr)/2	6	feet
FTA Ground Attenuation Factor G	0.643	dBA

Distance from Construction Site (feet)	Noise Level with Attenuation: Outdoor Leq	Noise Level with Attenuation: Outdoor L8	Noise Level with Barrier (Levees): Noise Reduction	Noise Level with Barrier (Levees): Outdoor Leq
100	75	78	0	75
200	67	70	0	67
400	59	62	0	59
800	50	53	0	50
1,600	41	44	0	41
3,200	30	33	0	30
6,400	17	20	0	17

Sound propagation calcs by FTA Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. May 2006.
Acoustical measurement in FHWA Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January 2006.

This spreadsheet calculates traffic noise levels based on TNM Version 2.5 Lookup Tables

******** PRESS F9 to Calculate ****** then, wait approx. 10 seconds until status at lower left of window says "Ready"**

**** Type in yellow cells only.**

** Day/Eve/Night & Auto/MT/HT cells must add to 100

** Be sure to indicate ENGLISH or METRIC units

** Note that both Ldn and CNEL require input for evening traffic

Day = 12 hours, 7:00 AM to 7:00 PM
Eve = 3 hours, 7:00 PM to 10:00 PM
Night = 9 hours, 10:00 PM to 7:00 AM

CONTOUR VALUES		
1	65	dB
2	60	dB
3	55	dB
4	50	dB

UNITS	english
	"english" OR "metric"

DAY PEAK/OFFPEAK SPLITS		PENALTIES
4	no. of hours - peak	dB
8	no. of hours - offpeak	
3	no. of hours - evening	+ 5
9	no. of hours - night	+ 10
24	TOTAL no. of hours	

METRIC/ENGLISH CALCULATOR				
80	MPH	equals	128.74	KPH
100	KPH	equals	62.14	MPH
680	feet	equals	207.26	meters
9	meters	equals	29.53	feet

Mix 1.

		Day Peak	Day Offpk	Eve	Night
		34	40	11	15
Auto	90	.306	.360	.099	.135
MT	5	.017	.020	.006	.008
HT	5	.017	.020	.006	.008

Mix 2.

		Day Peak	Day Offpk	Eve	Night
		34	43	10	13
Auto	83	.282	.357	.083	.108
MT	8	.027	.034	.008	.010
HT	9	.031	.039	.009	.012

Mix 3.

		Day Peak	Day Offpk	Eve	Night
Auto		.000	.000	.000	.000
MT		.000	.000	.000	.000
HT		.000	.000	.000	.000

*** CHECKSUM ***

* distance from center of roadway

Number	Roadway	Segment Location	Hard or Soft Ground (H or S)	Total Daily Traffic Volumes	SPEED MPH	Mix Number	RECEIVER Distance * (feet)	dB Ldn	dB CNEL	dBA Pk Leq1h
	APWRA Construction Traffic				ENGLISH		ENGLISH			
1	Patterson Pass Road		S	3200	50	1	150	54.9	55.3	54.4
2	Patterson Pass Road with Construction		S	3620	50	2	150	56.3	56.8	56.4
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										

Appendix E

Comments on the Draft Environmental Impact Report and Responses to Comments

Appendix E
Comments on the Draft Environmental Impact Report and Responses to Comments

The Draft PEIR was circulated for review and comment by the public, other interested parties, and public agencies. The comment letters received and the names of the commenters are listed in Table E-1. Copies of the letters and other written comments are included in this chapter.

State CEQA Guidelines Sections 15088(a) and 15088(b) require that comments raising environmental issues must receive reasoned, good faith, written responses in the Final PEIR. This chapter contains all the comments received on the Draft PEIR and the Lead Agency's responses to these comments. In general, the responses provide explanation or amplification of information contained in the Draft PEIR.

CEQA is primarily focused on the potential significant environmental impacts that may result from a project. Comments that are outside the scope of CEQA review will be provided to the County for consideration as part of the project approval process. These comments are answered with a general response.

The comment letters have been organized into five categories of commenter and numbered as shown in Table E-1. Within each letter, individual comments have been numbered consecutively. For example Comment FA-1-1 is the first comment in the comment letter received from the U.S. Fish and Wildlife Service, which is a Federal Agency.

Revisions made to the Draft PEIR in response to comments are presented in the body of the comment as text to be deleted (~~strikethrough~~) and text to be added (<u>underline</u>). The Final PEIR incorporates these changes, as well as minor, clarifying revisions made by the Lead Agency. A complete underline/strikeout version of the Final PEIR included on disc with printed copies of the Final PEIR or available on request.

Table E-1. Comment Letters Received on the Draft EIR

ID #	Name	Date
Federal Agencies		
FA-1	U.S. Fish and Wildlife Service	July 24, 2014
State Agencies		
SA-1	California Department of Transportation	July 21, 2014
Local Agencies		
LA-1	East Bay Regional Park District	July 21, 2014
LA-2	Alameda County APWRA Scientific Review Committee	July 16, 2014
Nongovernmental Organizations		
NGO-1	Audubon California	July 21, 2014
NGO-2	Save Mount Diablo	July 18, 2014
General Public		
GP-1	Robert Cooper	June 30, 2014
GP-2	Altamont Winds, LLC	July 21, 2014
GP-3	EDF Renewable Energy	July 21, 2014
GP-4	Golden Hills, LLC	July 21, 2014

E.1 Master Responses

The following responses address important issues raised by multiple commenters. Master Responses were prepared to address these topics and provide a consistent response to these comments. Where specific comments raise the topics addressed in these Master Responses, the Master Responses are referenced by number (e.g., Master Response 1).

E.1.1 Master Response 1—Baseline and Determination of Significance

Baseline

The County determined that the appropriate baseline for analysis of environmental impacts of repowering wind energy projects in the APWRA was the actual existing physical conditions at the time of issuance of the Notice of Preparation (NOP) for the EIR (on August 24, 2010), as provided for in the State CEQA Guidelines Section 15125(a). These conditions include operation of existing wind turbines. In view of the following considerations, the County determined that it was reasonable to assume that wind energy generation would continue to occur in the APWRA.

- Wind energy generation is supported by government policies and by the energy market.
- The APWRA is a high-quality source of wind energy.
- Infrastructure supporting wind energy generation is in place in the APWRA.

As described in the Draft PEIR, the proposed program and specific projects entail a change from one type of wind energy generation facility to another type, while maintaining the overall function of wind energy generation.

In each topical section of the PEIR, a description of relevant existing conditions is presented. For example, in the Section 3.1, *Aesthetics*, the existing visual characteristics of the program and project areas are presented in both text and photographs.

The California Environmental Quality Act (CEQA) Guidelines provide that existing conditions at the time an NOP is released or when environmental review begins "normally" constitute the baseline for environmental analysis (State CEQA Guidelines Section 15125). In 2010, the California Supreme Court issued an opinion holding that while lead agencies have some flexibility in determining what constitutes the baseline, relying on "hypothetical allowable conditions"—when those conditions are not a realistic description of the conditions without the project—would be an illusory basis for a finding of no significant impact from the project and, therefore, a violation of CEQA (*Communities for a Better Environment v. South Coast Air Quality Management District* [2010] 48 Cal.4th 310).

The state Supreme Court has recognized that there is a difference between baseline, no project alternative, and cumulative impact analyses. An EIR must include an analysis of the impacts in each of these cases. These three types of analyses can be characterized as follows.

- Baseline: Existing and/or, when justified by knowledge of anticipated changes in environmental conditions (e.g., separately approved or anticipated projects), future conditions. The baseline provides the public and decision makers with an understanding of the current or background character of conditions. The EIR must analyze the changes from baseline conditions that would occur should the project be approved. An EIR should disclose existing conditions even when the future condition is justifiably used as baseline, as a point of information.
- No Project: Future conditions based on a reasonable projection of planned activities. The EIR must analyze the changes from existing conditions that would occur as a result of a future without the project.
- Cumulative Impact: Analysis of the project's contribution to a cumulative significant impact resulting from past, present, and reasonably foreseeable future actions and the determination of whether that contribution is "considerable."

It is important to understand the difference between the No Project alternative and the baseline. As described above, the baseline is defined existing conditions. As described in detail on pages 4-1 and 4-2 of the Draft PEIR, CEQA requires that the No Project alternative be analyzed and that such an analysis include what would be reasonably expected to occur in the foreseeable future if the project were not approved based on current plans and consistent with available infrastructure and community services. Because, as described above, it is reasonable to anticipate that wind energy generation will continue to operate in the APWRA, the No Project alternative analyzed in the Draft PEIR involved a scenario in which existing turbines would continue to operate as they do at the present time, without repowering and with reauthorization of the existing or similar turbines. The No Project alternative is considered *as an alternative* to the proposed project, and is not the baseline to which the impacts of the proposed program were compared to determine the level of significance. The County considers the probability of continued use of the APWRA for wind energy use, even with existing old-generation turbines, to be far more likely in the future than removal and abandonment of all or most of the turbines in the APWRA.

Determination of Significance

Given the characteristics of the APWRA and of the proposed projects and program, determining the baseline and the threshold of significance for avian impacts was particularly important. Specific information on that baseline, including how it was developed and quantified, is found in *Avian Fatality Analysis Methods* on pages 3.4-51 through 3.4-53 of the Draft PEIR. Additional explanation is provided in Master Response 3.

Several commenters requested clarification regarding the determination of significance for impacts on avian species. In response to these comments, the first three paragraphs of *Determination of Significance* on page 3.4-55 of the Draft PEIR (Section 3.4, *Biological Resources*) have been revised as shown below to clarify the significance determination for impacts on avian species.

> The basis for determining when a given impact exceeds the threshold of significance—that is, when it has a substantial adverse effect—was determined by the professional judgment of qualified biologists. Under long-established CEQA practice and principle, such determinations are derived from comparison with the baseline of existing conditions, as the focus of CEQA is on "substantial adverse effect" as a change from existing conditions. The analysis of impacts on biological resources, and in particular on avian species in the program area, accordingly, entailed the comparison of the existing condition of ~~infrequent but~~ regular and more or less predictable levels of avian mortality associated with the existing wind turbines—the baseline mortality rate defined above in *Avian Fatality Analysis Methods*—with the anticipated or calculated projection of the mortality rate that would result from implementation of the program or projects. Where the projected rate would exceed the baseline rate, the impact would typically be significant; if the projected rate is below the baseline rate, the impact would typically be considered less than significant. The County considered several issues involving use of the typical determination of significance outlined above.
>
> - The baseline condition is one that already results in a substantial number of avian fatalities, which in itself constitutes a significant impact. ~~These calculations are informed by two factors:~~
> - ~~(1)~~ Avian mortality ~~is comprised~~ consists of a series of temporal, moment-to-moment events; accordingly, it cannot be ~~that is not~~ viewed as a constant in the way that other baseline environmental conditions ~~exist~~, such as presence of existing habitat areas, ~~air quality~~landscape features, or an earthquake fault, can be viewed~~; and~~ .
> - ~~(2)~~ Estimation of fatality rates from existing and new-generation turbines is, as discussed in ~~more detail below~~the impact analysis, variable and uncertain.
> - ~~Another condition under which a~~A determination of significance would be ~~made would be~~ appropriate if wind turbine operations ~~would~~ could violate specific laws and regulations (e.g., ESA, CESA, MBTA) that are not ~~based on~~tied to mortality rates ~~of mortality~~.
> - ~~The analysis in this PEIR is also informed by the~~ Commitments were agreed to by the majority of the wind operators, documented in the 2007 Settlement Agreement, ~~by the majority of the wind operators~~ to achieve a 50% reduction in avian fatalities ~~from an estimated baseline~~ of annual fatalities of four focal species (golden eagle, burrowing owl, American kestrel, and red-tailed hawk) through ~~the~~ implementation of the Avian Wildlife Protection Program and Schedule (AWPPS) as established in 2005 and modified in 2007.
>
> Accordingly, in view of the foregoing considerations, the fact that even reduced avian fatalities could violate specific laws and regulations, and the conservation approach described in the 2007 Settlement Agreement, the County has determined that the threshold of significance for impacts on avian species is effectively any level of avian mortality above zero.

The County believes that this clarification regarding the determination of significance for avian impacts is consistent with the approach and mitigation actually used and already required in the

Draft PEIR—for example, the required mitigation for all raptor fatalities regardless of whether the impact exceeds baseline levels.

E.1.2 Master Response 2—Program Area Boundary

Comments were received from several commenters regarding the selection of the program area boundary. As discussed in detail in Section 2.1, *Program Location and Program Area*, on page 2-1 of the Draft PEIR, the program area boundary is a revised boundary that was developed using the 70-meter wind speed data produced by CEC, larger than the APWRA boundary previously identified in the Alameda County General Plan. This revised boundary was developed during early preparation of the NCCP/HCP, which is discussed in greater detail in *History since 2001* on pages 1-5 through 1-8 of the Draft PEIR. Within the APWRA boundary identified in the General Plan, as in other similarly rural areas, the County designated and zoned the area for large parcels (160- and 320-acre minimum) to support agricultural and wind energy uses. The area was not specifically zoned for wind energy uses.

The program area boundary presented in the PEIR is the same as that described in the NOP for the PEIR, and thus has been subject to public review during the scoping period for the EIR.

Comments were received that approval of new turbines in the expanded program area should be subject to CEQA assessment and public review. At a program level, the PEIR provides that environmental and public review by evaluating the County's approval of wind energy projects within the program area. As described in detail in Section 1.1.2, *Program-Level Analysis and Tiering*, of the Draft PEIR, specific projects proposed in the future would undergo project-level environmental analysis tiered from the PEIR. The two individual projects evaluated at the project level in the PEIR are within the APWRA boundary as established in the Alameda County General Plan.

E.1.3 Master Response 3—Avian Mortality Rates Methodology for Existing Conditions

Several commenters noted that in the Draft PEIR, the baseline fatality rates used were the average over the course of the study on which the analysis was based (2005–2011 bird years) as opposed to the average over the last 3 years. The argument presented for using the last 3 years is that these fatality rates may be more representative because all management actions (i.e., removal of hazardous turbines and 3.5-month universal seasonal shutdown) to reduce avian fatalities were in effect during those years. However, annual variation (changes from one year to the next) is by far the largest component of variation in fatality rates. In fact, the evidence in support of the effectiveness of the various management actions is not conclusive, precisely because of the range of variation in fatality rates from year to year. The County therefore chose to include all years in the average to best account for this largest component of variation. The County believes that a sample size of 7 years—the largest sample of continuous monitoring data available—is more than sufficient to characterize the fatality rates for old-generation turbines. The decrease in fatality rates that would result from calculating rates using the last 3 years of data versus all 7 years of available data ranges from -9% for golden eagle to -27% for burrowing owl. Several commenters also indicated that because another year of data has become available since the publication of the Draft PEIR (i.e., the 2012 bird year), this additional year of data should be included in the baseline fatality rates in the Final PEIR. The County reviewed this information; however, as mentioned above, the County believes that a sample size of 7 years, as used in the Draft PEIR, is more than sufficient to characterize the fatality rates for old-generation turbines.

As discussed in Master Response 1, *Baseline and Determination of Significance*, although the average fatality rates at old-generation turbines constituted the baseline for assessment of impacts in the PEIR, the final conclusion of the PEIR is that the impact of turbine-related avian fatalities is significant and unavoidable; consequently, the PEIR requires mitigation for each raptor killed. For this reason, changing the fatality rates calculated for the baseline condition would not change the conclusions or the mitigation presented in the PEIR. It would, however, change the threshold at which adaptive management measures, including curtailment of turbine operations, would be implemented, since the baseline rate was used as the threshold for requiring implementation of adaptive management measures.

E.1.4 Master Response 4—Estimated Avian Mortality Rates Methodology

Several commenters noted that additional data from the second year of postconstruction fatality monitoring at the Vasco Winds Project is now available and recommended including this information in the Final PEIR. Since the preparation of the Draft PEIR, some additional information regarding golden eagle fatalities at the Vasco Wind Project has become available and is therefore being incorporated into the Final PEIR. At the time the Draft PEIR was prepared, the first year of postconstruction fatality monitoring at the Vasco Winds Project had been completed and a report had been prepared. Since the Draft PEIR was prepared, the second year of postconstruction fatality monitoring was completed. Although a report is not yet available, as part of its comments on the Draft PEIR, NextEra Energy Resources, the operator of the Vasco Winds Project, provided information on golden eagle fatalities found during the second year of monitoring at the project. Additional updated information on other avian species was not provided and is not available; accordingly, no revisions have been made to the Vasco Winds Fatality rates for all other avian species as presented in the Draft PEIR. Table 3.4-10 on page 3.4-53 of the Draft PEIR has been revised as shown below to include new information on golden eagle.

Table 3.4-10. Annual Adjusted Fatality Rates for Nonrepowered and Repowered APWRA Turbines

		Repowered		
Species/Group	Nonrepowered[a]	Diablo Winds[b]	Buena Vista[c]	Vasco Winds[d]
American kestrel	0.59	0.09	0.15	0.30
Barn owl	0.24	0.02	0.00	0.03
Burrowing owl	0.78	0.84	–	0.05
Golden eagle	0.08	0.01	0.04	~~0.02~~0.03[e]
Loggerhead shrike	0.19	0.00	–	–
Prairie falcon	0.02	–	0.00	–
Red-tailed hawk	0.44	0.20	0.10	0.25
Swainson's hawk	0.00	–	–	–
All raptors	2.43	1.21	0.31	0.64
All native non-raptors	4.50	2.51	1.01	2.09

Notes: fatality rates reflect annual fatalities per MW. "–" denotes that no fatalities were detected. "0.00" signifies that, although fatalities were detected, the rate is lower than two significant digits.

[a] Average of 2005–2011 bird years.

[b] Average of 2005–2009 bird years.

[c] Average of 3 years (2007–2009).

[d] Values from first year of monitoring (2013).

[e] Value updated based on information provided by NextEra Energy Resources on July 21, 2014. Value provided is an average of the adjusted rates from monitoring years 1 (0.016) and 2 (0.048).

Table 3.4-11 on page 3.4-99 of the Draft PEIR has been revised as shown below to reflect this new information.

Table 3.4-11. Estimated Annual Avian Fatalities for Existing and Repowered Program Area—Alternative 1 (417 MW)

	Estimated Annual Fatalities for Program Area						
	Nonrepowered	Repowered					
		Diablo Winds[a]		Buena Vista[b]		Vasco Winds[c,d]	
Species	Average Annual Fatalities	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease
American kestrel	194.2	37.5	81%	62.6	75%	123.8	36%
Barn owl	79.5	8.3	90%	0.0	100%	13.8	83%
Burrowing owl	255.1	350.3	-37%	0.0	100%	20.9	92%
Golden eagle	26.6	4.2	84%	16.7	44%	~~6.7~~13.3	~~75~~50%
Loggerhead shrike	61.8	0.0	100%	0.0	100%	0.0	100%
Prairie falcon	6.6	0.0	100%	0.0	100%	0.0	100%
Red-tailed hawk	144.5	83.4	42%	41.7	71%	102.6	29%
Swainson's hawk	0.5	0.0	100%	0.0	100%	0.0	100%
All raptors	799.9	504.6	37%	129.3	84%	267.7	67%
All native non-raptors	1,482.0	1,046.7	29%	421.2	81%	873.2	41%

Note: fatality rates reflect annual fatalities (95% confidence interval).
[a] Diablo Winds fatality rates extrapolated to the overall program area.
[b] Buena Vista fatality rates extrapolated to the overall program area.
[c] Vasco Winds fatality rates extrapolated to the overall program area.
[d] Vasco Winds fatality rate for golden eagle based on updated information received from NextEra Energy Resources on July 21, 2014, and extrapolated to the overall program area.

Table 3.4-12 on page 3.4-113 of the Draft PEIR has been revised as shown below to reflect this new information.

Table 3.4-12. Estimated Annual Avian Fatalities for Existing and Repowered Program Area—Alternative 2 (450 MW)

	Estimated Annual Fatalities for Program Area						
	Nonrepowered	Repowered					
		Diablo Winds[a]		Buena Vista[b]		Vasco Winds[c,d]	
Species	Average Annual Fatalities	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease
American kestrel	194.2	40.5	79	67.5	65	133.7	31
Barn owl	79.5	9.0	89	0.0	0	14.9	81
Burrowing owl	255.1	378.0	-48	0.0	100	22.5	91
Golden eagle	26.6	4.5	83	18.0	32	~~7.2~~14.4	~~73~~46
Loggerhead shrike	61.8	0.0	100	0.0	100	0.0	100
Prairie falcon	6.6	0.0	100	0.0	100	0.0	100
Red-tailed hawk	144.5	90.0	38	45.0	69	110.7	23
Swainson's hawk	0.5	0.0	100	0.0	100	0.0	100
All raptors	799.9	544.5	32	139.5	83	288.9	64
All native non-raptors	1,482.0	1,129.5	24	454.5	69	942.3	36

Note: fatality rates reflect annual fatalities (95% confidence interval).

[a] Diablo Winds fatality rates extrapolated to the overall program area.

[b] Buena Vista fatality rates extrapolated to the overall program area.

[c] Vasco Winds fatality rates extrapolated to the overall program area.

[d] Vasco Winds fatality rate for golden eagle based on updated information received from NextEra Energy Resources on July 21, 2014, and extrapolated to the overall program area.

Table 3.4-13 on page 3.4-116 of the Draft PEIR has been revised as shown below to reflect this new information.

Table 3.4-13. Estimated Annual Avian Fatalities for Existing and Repowered Golden Hills Project Area

	Estimated Annual Fatalities for Program Area						
	Nonrepowered	Repowered					
		Diablo Winds[a]		Buena Vista[b]		Vasco Winds[c,d]	
Species	Average Annual Fatalities	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease
American kestrel	47.5	8.0	83	13.3	72	26.3	45
Barn owl	19.4	1.8	91	–	–	2.9	85
Burrowing owl	62.4	74.3	-19	0.0	100	4.4	93
Golden eagle	6.5	0.9	86	3.5	46	~~1.4~~2.8	~~78~~57
Loggerhead shrike	15.1	0.0	100	0.0	100	0.0	100
Prairie falcon	1.6	0.0	100	0.0	100	0.0	100
Red-tailed hawk	35.4	17.7	50	8.8	75	21.7	39
Swainson's hawk	0.1	0.0	100	0.0	100	0.0	100
All raptors	195.7	107.0	45	27.4	86	56.8	71
All native non-raptors	362.6	221.9	39	89.3	75	185.1	49

Note: fatality rates reflect annual fatalities (95% confidence interval).

[a] Diablo Winds fatality rates extrapolated to the Golden Hills project area.

[b] Buena Vista fatality rates extrapolated to the Golden Hills project area.

[c] Vasco Winds fatality rates extrapolated to the Golden Hills project area.

[d] Vasco Winds fatality rate for golden eagle based on updated information received from NextEra Energy Resources on July 21, 2014, and extrapolated to the Golden Hills project area.

Table 3.4-14 on page 3.4-120 of the Draft PEIR has been revised as shown below to reflect this new information.

Table 3.4-14. Estimated Annual Avian Fatalities for Existing and Repowered Patterson Pass Project Area

	Estimated Annual Fatalities for Program Area						
	Nonrepowered	Repowered					
		Diablo Winds[a]		Buena Vista[b]		Vasco Winds[c,d]	
Species	Average Annual Fatalities	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease
American kestrel	12.9	1.8	86	3.0	77	5.9	54
Barn owl	5.2	0.4	92	–	–	0.7	87
Burrowing owl	16.9	16.6	2	0.0	100	1.0	94
Golden eagle	1.8	0.2	89	0.8	56	~~0.3~~0.6	~~82~~67
Loggerhead shrike	4.1	0.0	100	0.0	100	0.0	100
Prairie falcon	0.4	0.0	100	0.0	100	0.0	100
Red-tailed hawk	9.6	4.0	59	2.0	79	4.9	49
Swainson's hawk	0.0	0.0	0.0	0.0	0	0.0	0
All raptors	53.1	24.0	55	6.1	88	12.7	76
All native non-raptors	98.4	49.7	49	20.0	80	41.5	58

Note: fatality rates reflect annual fatalities (95% confidence interval).
[a] Diablo Winds fatality rates extrapolated to the Patterson Pass project area.
[b] Buena Vista fatality rates extrapolated to the Patterson Pass project area.
[c] Vasco Winds fatality rates extrapolated to the Patterson Pass project area.
[d] Vasco Winds fatality rate for golden eagle based on updated information received from NextEra Energy Resources on July 21, 2014 and extrapolated to the Patterson Pass project area.

The County notes that although additional information on avian species, other than golden eagle, is not yet available, the fatality rates used in the Draft PEIR represent the best available information on fatality rates at the Vasco Wind Project. Furthermore, while compensatory mitigation under Mitigation Measure BIO-11h is based on the Vasco Wind Project fatality rates, Mitigation Measure BIO-11g also requires applicants to conduct fatality monitoring at each project to determine project-specific fatality rates. Thus, while the first compensatory mitigation installment required for each project is based on the Vasco Wind Project fatality rates, each project will conduct postconstruction fatality monitoring, and subsequent compensatory mitigation will be based on project-specific rates, as described on page 3.4-108 of the Draft PEIR. The County selected this mitigation framework because individual projects would not have the results of project-specific postconstruction monitoring for at least 3 years following construction of the projects. The County therefore believes that the mitigation measure and the framework outlined will ensure that the compensatory mitigation is ultimately based on the estimated fatalities occurring at each specific project as identified through project-specific monitoring.

Several other comments were received regarding the use of other repowered projects as a method to estimate potential impacts at future repowered projects. Specifically, commenters stated that the Diablo Winds Project and the Buena Vista Wind Project were older technologies and/or used flawed methods to estimate fatalities, and therefore may underestimate the risk to birds and bats. The County concurs that there are potential biases with using these two projects to estimate the effects of future repowering projects, and acknowledged these biases in the Draft PEIR on pages 3.4-53 through 3.4-54 of the Draft PEIR. However, the County has determined that there is no other information available to help predict potential effects of future repowering projects; accordingly, the information presented in the Draft PEIR and used for the analysis is the best and only relevant information available at the time the Draft PEIR was prepared. Moreover, while the biases affect the prediction of potential effects from repowering, mitigation is not solely based on these predictions, as noted above. Each repowered project would be required to conduct postconstruction fatality monitoring to determine the impacts of each project, and mitigation would ultimately be based on the number of estimated fatalities for each project, ensuring that the required mitigation is commensurate with the estimated impacts.

E.1.5 Master Response 5—Avian Fatality Monitoring Methodology

Several commenters stated that the Draft PEIR did not describe in enough detail the requirements for avian fatality monitoring after construction of repowered projects. The Draft PEIR was intended to be flexible on this point, as the field of avian fatality monitoring at windfarms is rapidly evolving. However, Mitigation Measures BIO-11a on page 3.4-103 and BIO-11g on pages 3.4-106 and 3.4-107 have been revised as shown below to provide more clarity and detail on the requirements of postconstruction monitoring programs. Note also that changes referenced in Master Response 6 regarding the makeup of the TAC are included in these revisions.

Mitigation Measure BIO-11a: Prepare a project-specific avian protection plan

All project proponents will prepare a project-specific APP to specify measures and protocols consistent with the program-level mitigation measures that address avian mortality. The project-specific APPs will include, at a minimum, the following components.

- Information and methods used to site turbines to minimize risk.
- Documentation that appropriate turbine designs are being used.
- Documentation that avian-safe practices are being implemented on project infrastructure.
- Methods used to discourage prey for raptors.
- A detailed description of the postconstruction avian fatality monitoring methods to be used (consistent with the minimum requirements outlined in Mitigation Measure BIO-11g).
- Methods used to compensate for the loss of raptors (consistent with the requirements of Mitigation Measure BIO-11h).

Each project applicant will prepare and submit a draft project-specific APP to the County. The draft APP will be reviewed by the TAC for consistency and the inclusion of appropriate mitigation measures that are consistent with the PEIR and recommended for approval by the County. Each project applicant must have an approved Final APP prior to commercial operation.

Mitigation Measure BIO-11g: Implement postconstruction avian fatality monitoring for all repowering projects

A postconstruction monitoring program will be conducted at each repowering project for a minimum of 3 years beginning ~~with~~ on the ~~in 3 months of the~~ commercial operation date (COD) of the project. Monitoring may continue beyond 3 years if construction is completed in phases. Moreover, if the results of the first 3 years indicate that baseline fatality rates (i.e., nonrepowered fatality rates) are exceeded, monitoring will be extended until the average annual fatality rate has dropped below baseline fatality rates for 2 years, and to assess the effectiveness of adaptive management measures specified in Mitigation Measure BIO-11i. An additional 2 years of monitoring will be implemented at year 10 (i.e., the tenth anniversary of the COD). Project proponents will provide access to qualified third parties authorized by the County to conduct any additional monitoring after the initial 3-year monitoring period has expired and before and after the additional 2-year monitoring period, provided that such additional monitoring utilizes scientifically valid monitoring protocols.

A technical advisory committee (TAC) will be formed to oversee the monitoring program and to ~~consult~~ advise the County on adaptive management measures that may be necessary if fatality rates substantially exceed those predicted for the project (as described below in Mitigation Measure BIO-11i). The TAC will have a standing meeting, which will be open to the public, every 6 months to review monitoring reports produced by operators in the program area. In these meetings, the TAC will discuss any issues raised by the monitoring reports and ~~determine~~ recommend to the County next steps to address issues, including scheduling additional meetings, if necessary.

The TAC will comprise representatives from the County (including one or more ~~a~~ technical consultants, ~~contracted by the County, at its discretion~~ such as a biostatistician, an avian biologist, and a bat biologist), and wildlife agencies (CDFW, USFWS)~~, and,~~. a ~~representative of~~ the ~~operators of repowered wind projects in Alameda County.~~ Additional TAC members may also be considered (e.g., a representative from Audubon, a landowner in the program area, a representative of the operators) at the discretion of the County. The TAC will be a voluntary and advisory group that will ~~support~~provide guidance to the County Planning Department ~~decisions made by~~. ~~the County. As such, the TAC is not a decision-making body and will not be bound to the public noticing requirements of the Brown Act. However, t~~To maintain transparency with the public, all TAC meetings will be open to the public, and notice of meetings will be given to interested parties.

The TAC will have three primary advisory roles: (1) to review and advise on project planning documents (i.e., project-specific APPs) to ensure that project-specific mitigation measures and compensatory mitigation measures described in this PEIR are appropriately and consistently applied, (2) to review and advise on monitoring documents (protocols and reporting) for consistency with the mitigation measures, and (3) to review and ~~monitor~~ advise on implementation of the adaptive management plans.

Should fatality monitoring reveal that impacts exceed the baseline thresholds established in this PEIR, the TAC will advise the County on requiring implementation of adaptive management measures as described in Mitigation Measure BIO-11i. The County will have the ~~ultimate~~ decision-making authority, as it is the organization issuing the CUPs. However, the TAC will collaboratively inform the decisions of the County.

Operators are required to provide for avian use surveys to be conducted within the project area boundaries for a minimum of 30 minutes duration. Surveyors will be qualified and trained and subject to approval by the County.

Carcass surveys will be conducted at every turbine for projects with 20 or fewer turbines. For projects with more than 20 turbines, such surveys will be required at a minimum of 20 turbines, and a sample of the remaining turbines may be selected for carcass searches. The operator will be required to demonstrate that the sampling scheme and sample size are statistically rigorous and defensible. Where substantial variation in terrain, land cover type, management, or other factors may contribute to significant variation in fatality rates, the sampling scheme will be stratified to account for such variation. The survey protocol for sets and subsets of turbines, as well as proposed sampling schemes that do not entail a search of all turbines, must be approved by the County in consultation with the TAC prior to the start of surveys.

The search interval will not exceed 14 days for the minimum of 20 turbines to be surveyed; however, the search interval for the additional turbines (i.e., those exceeding the 20-turbine minimum) that are to be included in the sampling scheme may be extended up to 28 days or longer if recommended by the TAC.

The estimation of detection probability is a rapidly advancing field. Carcass placement trials, broadly defined, will be conducted to estimate detection probability during each year of monitoring. Sample sizes will be large enough to potentially detect significant variation by season, carcass size, and habitat type.

<u>Operators will be required to submit copies of all raw data forms to the County annually, will supply raw data in a readily accessible digital format to be specified by the County, and will prepare raw data for inclusion as appendices in the annual reports. The intent is to allow the County to conduct independent analyses and meta-analyses of data across the APWRA, and to supply these data to the regulatory agencies if requested.</u>

<u>Annual reports submitted to the County will provide a synthesis of all information collected to date. Each report will provide an introduction; descriptions of the study area, methods, and results; a discussion of the results; and any suitable recommendations. Reports will provide raw counts of fatalities, adjusted fatality rates, and estimates of project-wide fatalities on both a per MW and per turbine basis.</u>

E.1.6 Master Response 6—Technical Advisory Committee

Several comments were received regarding the responsibilities of the TAC, including a request for information regarding the future role of the APWRA Scientific Review Committee (SRC) and how the role of the new TAC will compare to that of the SRC. Several commenters had specific recommendations for the make-up of the TAC, including the types of individuals that should be included, such as qualified scientists and biostatisticians. The County Board of Supervisors originally established the requirement for the formation of the SRC in 2005, prior to the 2007 Settlement Agreement, to address impacts associated with avian mortality in the APWRA and to have the primary stakeholder groups represented on the Committee. At that time, the existing CUPs were set to expire in 13 years (in 2018). Consequently, the SRC has no defined role or oversight when the existing permits expire. The SRC has been instrumental in providing the guidance to achieve avian mortality reduction goals and has provided the foundation to ensure that avian monitoring and analysis are implemented in an open and transparent manner and using the best available science and information. While the structure of the SRC has been beneficial, the cost of maintaining such a committee is significant for the County and the operators and, unlike the conditions of the existing permits, established mitigation measures in the PEIR will provide guidance for the review body. Accordingly, the County, like other nearby counties (i.e., Contra Costa and Solano) has decided to establish a new review body, the APWRA Technical Advisory Committee (TAC). The TAC was described in Mitigation Measure BIO-11g beginning on page 3.4-106 of the Draft PEIR. The County intends that the overall duties of the TAC will be similar to those of the SRC in that the group will review documents and plans to ensure consistency among projects, ensure that the best available science is used, and serve an advisory role to the Planning Department.

In response to comments received on the PEIR, Mitigation Measure BIO-11g on pages 3.4-106 and 3.4-107 of the Draft PEIR has been revised to provide clarification regarding the TAC. The revised language is presented above in Master Response 5.

The County believes that the framework described in the Draft PEIR is consistent with the overall goals and objectives described by the commenters, including a TAC that is open to public review, that uses the best available science to inform management recommendations to achieve avian and bat management and conservation, and that includes the appropriate individuals with the knowledge and expertise necessary to make informed recommendations to the County. The County would ultimately condition each project with specific roles, responsibilities, funding requirements, and expectations regarding the TAC, consistent with Mitigation Measure BIO-11g. If approved, construction of the Golden Hills and Patterson Pass projects could take place in 2015; accordingly, the County envisions establishment of the TAC immediately following approval of these projects.

E.1.7 Master Response 7—Migratory Bird Treaty Act

Several commenters suggested that the Draft PEIR should include an assessment of the impacts on all birds. In reality, the set of birds for which data are available is limited. Some species were recorded as fatalities at some locations in the APWRA, but not at others. Additionally, in general, species that were not addressed in detail are either common or exhibit relatively low fatality rates. Consequently, the County determined to use an analysis of focal species, species of local conservation concern (i.e., species addressed in the Draft Program APP), and all native non-raptors as a group, rather than presenting information on each individual species. The County believes that focusing the analysis in this manner, with a consideration of the biases in the data discussed on pages 3.4-53 and 3.4-54 of the Draft PEIR, is appropriate to address impacts on avian species.

As discussed in Master Response 1, the final conclusion of the Draft PEIR is that the impact of turbine-related avian fatalities (for all species) is significant and unavoidable. The PEIR requires compensatory mitigation for each raptor killed, and this mitigation will benefit all avian species, regardless of whether they are addressed individually in the PEIR.

E.1.8 Master Response 8—Avian Protection Plan

Several commenters noted that the Draft PEIR states that the key provisions of a program-level Avian Protection Plan (APP), developed by the County, have been incorporated into the PEIR as mitigation measures, and requested that the County provide copies of the program-level APP to enable comparison with the PEIR. As noted in *History since 2001* on page 1-8 of the Draft PEIR, the County began development of a program-level APP, intended to provide a framework for operation of turbines that would be incorporated into project-specific APPs developed by project applicants for each individual project prior to commencing repowering. The County worked with wildlife agencies and other stakeholders to prepare a draft program-level APP; however, as of preparation of the Draft PEIR, the program-level APP had not been finalized. Additionally, because no separate mechanism to implement the program-level APP was developed, the County determined that the best method to ensure implementation of the measures in the program-level APP would be to incorporate them as mitigation measures in the Draft PEIR. Consequently, the measures in the draft program-level APP were incorporated into the Draft PEIR, with modifications to respond to public comments on the NOP, and as determined necessary by the County to ensure that they were feasible. Additionally, the County believes that incorporating the measures in the draft APP into the Draft PEIR allows for a more complete and in-depth review by the public and other stakeholders. Consequently, the program-level APP document is no longer relevant or applicable and accordingly was not included with the Draft PEIR. The PEIR effectively serves as the programmatic APP with review and comments incorporated as part of the CEQA public comment process. Nevertheless, in response to these comments, the draft program-level APP document has been attached in Appendix F, *Historical Documentation*, of the Final PEIR.

Several commenters also stated that the contents and requirements of the project-specific APPs are unclear. Mitigation Measure BIO 3.4-104 on page 3.4-104 of the Draft PEIR requires preparation of project-specific APPs. The text of Mitigation Measure BIO-11a on page 3.4-104 has been modified as shown in Master Response 5, *Avian Fatality Monitoring Methodology*, to provide clarification of the goals, content, and requirements of the project-specific avian protection plans, as well as the review of the TAC and the County.

The County believes that these modifications address the concerns regarding the contents and requirements of the project-specific APPs.

E.1.9 Master Response 9—Avian Compensatory Mitigation

Numerous commenters provided suggestions regarding Mitigation Measure BIO-11h, including several suggestions regarding the option to contribute to raptor recovery efforts through contributions to rehabilitation facilities, how specific mitigation options would be selected, and clarifications regarding the suggested duration of the compensatory mitigation increments (i.e., 10 years), as well as other conservation measures that may be feasible now or in the future. After careful reevaluation, the County has determined that the option to contribute to raptor recovery efforts, while an important effort, is not an appropriate conservation measure in this instance because it would not benefit any species other than those raptors under the care of such facilities, and consequently it is inconsistent with the overall avian conservation approach outlined in Mitigation Measure BIO-11h. Accordingly, that option has been removed from Mitigation Measure BIO-11h; however, the per-raptor dollar value has been retained as a metric for determining the amount of contribution to conservation efforts as described in the subsequent option. In addition, the County has revised the last bullet of the mitigation measure to include additional options suggested by commenters. Regarding the process for determining which option(s) are selected, the revised measure below requires project applicants to submit a project-specific avian mitigation plan to the TAC and the County as part of their project-specific Avian Protection Plans (required under Mitigation Measure BIO-11a to be approved prior to the start of commercial operations). The County and the TAC will review and consider whether a specific option, or combination of options, as proposed, are appropriate to mitigate the effects as described in Mitigation Measure BIO-11h.

Mitigation Measure BIO-11h, on pages 3.4-109 and 3.4-110 of the Draft PEIR, has been revised as shown below.

Mitigation Measure BIO-11h: Compensate for the loss of raptors <u>and other avian species</u>, including golden eagles, by contributing to conservation efforts

Discussion

Several options to compensate for impacts on raptors are currently available. Some are targeted to benefit certain species, but they may also have benefits for other <u>raptor and non-raptor</u> species. For example, USFWS's ECP Guidelines currently outline a compensatory mitigation strategy for golden eagles using the retrofit of high-risk power poles (poles known or suspected to electrocute and kill eagles). The goal of this strategy is to eliminate hazards for golden eagles. However, because the poles are also dangerous for other large raptors (e.g., red-tailed hawk, Swainson's hawk), retrofitting them can benefit such species as well as eagles.

Similarly, although the retrofitting of electrical poles may have benefits for large raptors, such an approach may provide minimal benefits for smaller raptors such as American kestrel and burrowing owl. Consequently, additional measures would be required components of an overall mitigation package to compensate for impacts on raptors in general.

The Secretary of the Interior issued Order 3330 on October 31, 2013, outlining a new approach to mitigation policies and practices of the Department of the Interior. This approach recognizes that certain strategies aimed at some species <u>(e.g., raptors)</u> can provide substantial benefit to others <u>(e.g., non-raptors)</u> and to the ecological landscape as a whole. The landscape-scale approach to mitigation and conservation efforts is now central to the Department's mitigation strategy. Although the Order was intended for use by federal agencies and as such is not directly applicable to the County, it is evident that such an approach would likely have the greatest mitigation benefits, especially when considering ongoing and long-term impacts from wind energy projects.

With these considerations in mind, the County has outlined several options that are currently available to compensate for impacts on raptors and other avian species. The options discussed below are currently considered acceptable approaches to compensation for impacts on raptors and other species. Although not every option is appropriate for all species, it is hoped that as time proceeds, a more comprehensive landscape-level approach to mitigation will be adopted to benefit a broader suite of species than might benefit from more species-specific measures. The County recognizes that the science of raptor conservation and the understanding of wind-wildlife impacts are continuing to evolve and that the suite of available compensation options may consequently change over the life of the proposed projects.

Conservation Measures

To promote the conservation of raptors and other avian species, project proponents will compensate for raptor fatalities estimated within their project areas. Mitigation will be provided in 10-year increments, with the first increment based on the estimates (raptors/MW/year) provided in this PEIR for the Vasco Winds Project (Table 3.4-10) or the project-specific EIR for future projects. The Vasco Winds fatality rates were selected because the Vasco turbines are the most similar to those likely to be proposed for future repowering projects and consequently represent the best available fatality estimates. Each project proponent will conduct postconstruction fatality monitoring for at least 3 years beginning at project startup (date of commercial operation) and again for 2 years at year 10, as ~~mandated~~ required under Mitigation Measure BIO-11g, to estimate the average number of raptors taken each year by each individual project. The project proponent will compensate for this number of raptors in subsequent 10-year increments for the life of the project (i.e., three 10-year increments) as outlined below. Mitigation Measure BIO-11g also requires additional fatality monitoring at year 10 of the project. The results of the first 3 years of monitoring and/or the monitoring at year 10 may lead to revisions of the estimated average number of raptors taken, and mitigation provided ~~can~~ may be adjusted accordingly on a one-time basis within each of the first two 10-year increments, based on the results of the monitoring required by Mitigation Measure BIO-11g, in consultation with the TAC. ~~in future 10-year increments.~~

Prior to the start of operations, project proponents will submit for County approval an ~~Raptor~~ avian ~~mitigation plan~~conservation strategy, as part of the project-specific APP outlined in Mitigation Measure BIO-11a, outlining the estimated number of raptor fatalities based on the number and type of turbines being constructed, and the type or types of compensation options to be implemented. Project proponents will use the ~~Raptor~~avian ~~mitigation pPlan~~conservation strategy to craft an appropriate strategy using a balanced mix of the options presented below, as well as considering new options suggested by the growing body of knowledge during the course of the project lifespan, as supported by a Resource Equivalency Analysis (REA) (see example in Appendix C) or similar type of compensation assessment acceptable to the County that demonstrates the efficacy of proposed mitigation for impacts on raptors.

The County Planning Director, in consultation with the TAC, will consider, based on the REA, whether the proposed avian~~Raptor mitigation plan~~conservation strategy is adequate, including consideration of whether each ~~Raptor~~ avian mitigation plan incorporates a landscape-scale approach such that the conservation efforts achieve the greatest possible benefits. Compensation measures as detailed in an approved ~~Raptor~~avian ~~mitigation plan~~ conservation strategy must be implemented within 1 year of the ~~start~~ date of commercialoperations. ~~Raptor~~ Avian ~~mitigation plans~~conservation strategies ~~may be revised—and~~ will be reviewed and may be revised by the County ~~—~~every 10 years, and on a one-time basis in each of the two 10-year increments based on the monitoring required by Mitigation Measure BIO-11g.

- **Retrofitting high-risk electrical infrastructure.** USFWS's ECP Guidelines outline a compensatory mitigation strategy using the retrofit of high-risk power poles (poles known or suspected to electrocute and kill eagles). USFWS has developed an REA (U.S. Fish and Wildlife

Service 2013) as a tool to estimate the compensatory mitigation (number of retrofits) required for the take of eagles. The REA takes into account the current understanding of eagle life history factors, the effectiveness of retrofitting poles, the expected annual take, and the timing of implementation of the pole retrofits. The project proponents may need to contract with a utility or a third-party mitigation account (such as the National Fish and Wildlife Foundation) to retrofit the number of poles needed as demonstrated by a project-specific REA. If contracting directly, the project proponent will consult with utility companies to ensure that high-risk poles have been identified for retrofitting. Proponents will agree in writing to pay the utility owner/operator to retrofit the required number of power poles and maintain the retrofits for 10 years and will provide the County with documentation of the retrofit agreement. The first retrofits will be based on the estimated number of eagle fatalities as described above in this measure or as developed in the project-specific EIR for future projects. Subsequent numbers of retrofits required for additional 10-year durations will be based on the results of project-specific fatality monitoring as outlined in Mitigation Measure BIO-11g. If fewer eagle fatalities are identified through the monitoring, the number of future required retrofits may be reduced through a project-specific REA. Although retrofitting poles has not been identified as appropriate mitigation for other large raptors, they would likely benefit from such efforts, as they (particularly red-tailed and Swainson's hawks) constitute the largest non-eagle group to suffer electrocution on power lines (Avian Power Line Interaction Committee 2006).

- **Measures outlined in an approved Eagle Conservation Plan and Bird and Bat Conservation Strategy.** Project proponents may elect to apply for programmatic eagle take permits from USFWS. The programmatic eagle take permit process currently involves preparation of an ECP and a Bird and Bat Conservation Strategy (BBCS). The ECP specifies avoidance and minimization measures, advanced conservation practices, and compensatory mitigation for eagles—conditions that meet USFWS's criteria for issuance of a permit. The BBCS outlines measures being implemented by the applicant to avoid and minimize impacts on migratory birds, including raptors. If programmatic eagle take permits are obtained by project proponents, those permit terms, including the measures outlined in the approved ECP and BBCS, may constitute an appropriate conservation measure for estimated take of golden eagles and other raptors, provided such terms are deemed by the County to be comparable to or more protective of raptors than the other options listed herein.

- ~~**Contribute to raptor recovery efforts.** Project proponents may elect to contribute funds to raptor recovery centers such as the California Raptor Center (Center). The Center is affiliated with the UC Davis School of Veterinary Medicine, and its programs focus on raptor education, raptor health care and rehabilitation, and raptor research. The average cost to rehabilitate one raptor is approximately $580 (Stedman pers. comm.). The Center receives more than 200 injured or ill raptors annually. Approximately 60–65% are rehabilitated and returned to the wild. In a typical year, the four raptor species most commonly brought in for care are barn owl (96 admissions in 2006), American kestrel (20 admissions), red-tailed hawk (19 admissions), and Swainson's hawk (15 admissions) (California Raptor Center 2011). The Center relies on donations of time and resources to provide resident raptor care and feeding, underwrite education programs, provide rehabilitation medical supplies and medication, and maintain its facilities. The first contributions for any given project will be based on the estimated number of raptor fatalities as described above in this measure or as developed in the project-specific EIR for future projects. Subsequent funds required for additional 10-year installments will be provided on the basis of the average annual raptor fatality rates determined through postconstruction monitoring efforts. Ten-year installments are more advantageous than more frequent installments for planning and budgeting purposes. The donation receipt will be provided to the County as evidence of payment. If fewer raptor fatalities are determined through the monitoring effort, the second installment amount may be reduced to account for the difference between the first estimated numbers and the monitoring results.~~

- **Contribute to raptor conservation efforts.** Project proponents will contribute funds, ~~equivalent to raptor recovery efforts above (i.e.,~~ in the amount of $580/raptor fatality~~)~~, in 10-

year increments to ~~other~~ local and/or regional conservation efforts designed to protect, recover, and manage lands for raptors, or to conduct research involving methods to reduce raptor fatalities or increase raptor productivity. The $580 amount is based on the average cost to rehabilitate one raptor at the California Raptor Center, affiliated with the UC Davis School of Veterinary Medicine, which receives more than 200 injured or ill raptors annually (Stedman pers. comm.). Ten-year installments are more advantageous than more frequent installments for planning and budgeting purposes.

The~~se~~ funds will be contributed to an entity or entities engaged in these activities, ~~including, but not necessarily limited to,~~such as the East Bay Regional Park District and the Livermore Area Regional Park District. Conservation efforts may include constructing and installing nest boxes and perches, conducting an awareness campaign to reduce the use of rodenticide, and conducting research to benefit raptors. The specific conservation effort to be pursued will be submitted to the County for approval as part of the ~~Raptor Mitigation Plan~~avian conservation strategy review process. The donation receipt will be provided to the County as evidence of payment.

The first contributions for any given project will be based on the estimated number of raptor fatalities as described above in this measure or as developed in the project-specific EIR for future projects. Funds for subsequent 10-year installments will be provided on the basis of the average annual raptor fatality rates determined through postconstruction monitoring efforts, allowing for a one-time adjustment within each 10-year increment after the results of the monitoring efforts are available. If fewer raptor fatalities are detected through the monitoring effort, the second installment amount may be reduced to account for the difference between the first estimated numbers and the monitoring results.

- **Contribute to regional conservation of raptor habitat.** Project proponents may address regional conservation of raptor habitat by funding the acquisition of conservation easements within the APWRA or on lands in the same eco-region outside the APWRA, subject to County approval, for the purpose of long-term regional conservation of raptor habitat. Lands proposed for conservation must be well-managed grazing lands similar to those on which the projects have been developed. Project proponents will fund the regional conservation and improvement of lands (through habitat enhancement, lead abatement activities, elimination of rodenticides, and/or other measures) using a number of acres equivalent to the conservation benefit of the raptor recovery and conservation efforts described above, or as determined through a project-specific REA (see example REA in Appendix C). The conservation lands must be provided for compensation of a minimum of 10 years of raptor fatalities, as 10-year increments will minimize the transaction costs associated with the identification and conservation of lands, thereby increasing overall cost effectiveness. The conservation easements will be held by an organization whose mission is to purchase and/or otherwise conserve lands, such as The Trust for Public Lands, The Nature Conservancy, California Rangeland Trust, or the East Bay Regional Parks District. The project proponents will obtain approval from the County regarding the amount of conserved lands, any enhancements proposed to increase raptor habitat value, and the entity holding the lands and/or conservation easement.
- **Other Conservation Measures Identified in the Future.** As noted above, additional conservation measures for raptors may become available in the future. Conservation measures for raptors are currently being developed by USFWS and nongovernmental organizations (e.g., American Wind Wildlife Institute)—for example, activities serving to reduce such fatalities elsewhere, and enhancing foraging and nesting habitat. Additional options for conservation could include purchasing credits at an approved mitigation bank, credits for the retirement of windfarms that are particularly dangerous to birds or bats, the curtailment of prey elimination programs, and hunter-education programs that remove sources of lead from the environment. Under this option, the project proponent may make alternative proposals to the County for conservation measures—based on an REA or similar compensation assessment—that the County may accept as mitigation if they are deemed by the County to be comparable to or more protective of raptor species than the other options described herein.

E.1.10 Master Response 10—Adaptive Management

Several commenters noted that Mitigation Measure BIO-11i lacked specificity regarding how adaptive management measures would be implemented as well as the types and/or effectiveness of specific ADMMs included in the measure. Several commenters also noted several additional ADMMs that should be considered. In response to these comments, the County has revised Mitigation Measure BIO-11i on page 3.4-110 through 3.4-11 of the Draft PEIR as follows to add additional specificity and to clarify the measure.

Mitigation Measure BIO-11i: Implement an avian adaptive management program

If fatality monitoring described in Mitigation Measure BIO-11g results in an estimate that exceeds the preconstruction baseline fatality estimates (i.e., estimates at the nonrepowered turbines as described in this PEIR) for any focal species or species group (i.e., individual focal species, all focal species, all raptors, all non-raptors, all birds combined), ~~Each~~ project proponents will prepare ~~and implement~~ a project-specific adaptive management plan within 2 months following the availability of the fatality monitoring results. These plans will be used to adjust operation and mitigation to the results of monitoring, new technology, and new research to ensure that the best available science is used ~~to assess impacts and that~~to minimize impacts ~~are minimized~~ to ~~the greatest extent possible~~below baseline~~. Baseline fatality estimates (i.e., estimates at the nonrepowered turbines) will be used as the thresholds to trigger implementation of adaptive management measures (ADMMs).~~. Project-specific adaptive management plans will be reviewed by the TAC, revised by project proponents as necessary, and approved by the County. The TAC will take current research and the most effective impact reduction strategies into account when reviewing adaptive management plans and suggesting measures to reduce impacts. The project-specific adaptive management plans will be implemented within 2 months of approval by the County. The plans will include a stepped approach whereby an adaptive measure or measures are implemented, the results are monitored for success or failure for a year, and additional adaptive measures are added as necessary, followed by another year of monitoring, until the success criteria are achieved (i.e., estimated fatalities are below the baseline). Project proponents should use the best measures available when the plan is prepared in consideration of the specific adaptive management needs. For example, if only one threshold is exceeded, such as golden eagle fatalities, the plan and measures used will target that species. As set forth in other agreements in the APWRA, project proponents may also focus adaptive management measures on individual or multiple turbines~~,~~ if those turbines are shown to cause a significantly disproportionate number of fatalities.

In general, the following types of measures will be considered by the TAC, in the order they are presented below~~,~~; however, the TAC may recommend any of these or other measures that are shown to be successful in reducing the impact.

~~Threshold 1~~

~~If postconstruction fatality monitoring results in a point estimate for total fatalities that exceeds the preconstruction baseline fatality estimates for 1 year for any focal species or species group (i.e., all focal species, all raptors, all non-raptors, all birds combined), then the following ADMMs for avian species will be implemented.~~

ADMM-1: Visual Modifications. The project proponent ~~will~~ could paint a pattern on a proportion of the turbine blades. The proportion and the pattern of the blades to be painted will be determined by the County in consultation with the TAC. USFWS recommends testing measures to reduce *motion smear*—the blurring of turbine blades due to rapid rotation that renders them less visible and hence more perilous to birds in flight. Suggested techniques include painting blades with staggered stripes or painting one blade black. The project proponent will conduct fatality studies on a controlled number of painted and unpainted turbines. The project proponent will coordinate with the TAC to determine the location of the painted turbines, but the intent is to implement this measure in areas that appear to be contributing most to the high number of fatalities detected.

~~Threshold 2~~

~~If postconstruction fatality monitoring results in a point estimate for total fatalities that exceeds the preconstruction baseline fatality estimates for 2 consecutive years for any focal species or species group (i.e., all focal species, all raptors, all non-raptors, all birds combined), then the following ADMMs will be implemented in addition to ADMM-1.~~

ADMM-2: Anti-Perching Measures. The County will consult with the TAC regarding the use of anti-perching measures to discourage bird use of the area. The TAC will use the most recent research and information available to determine, on a case-by–case basis, if anti-perching measures will be an effective strategy to reduce impacts. If determined to be feasible, a~~A~~nti-perching devices will be installed on ~~all~~ artificial structures, excluding utility poles, within 1 mile of project facilities (with landowner permission) to discourage bird use of the area.

ADMM-3: Prey Reduction. The project proponent will implement a prey reduction program around the most hazardous turbines. Examples of prey reduction measures may include changes in grazing practices to make the area less desirable for prey species, active reduction through direct removal of prey species, or other measures provided they are consistent with management goals for threatened and endangered species.

ADMM-4~~3~~: ~~Contribution to Research~~Implementation of Experimental Technologies. ~~The project proponent will contribute $2,000 for each golden eagle fatality exceeding thresholds to support research of new technologies to help reduce turbine-related fatalities. Similarly, the p~~Project proponents ~~could~~ can deploy experimental technologies ~~at a comparable cost (if appropriate innovations become available)~~ at ~~its~~ their facilities to test their efficacy in reducing turbine-related fatalities. Examples may include, but are not limited to, visual deterrents, noise deterrents, and active radar systems. ~~Research could also investigate bird-turbine interactions, including population-level effects. The last golden eagle inventory of the APWRA vicinity was conducted in 2005 (Hunt and Hunt 2006). The researchers suggested that an inventory of the APWRA golden eagle population be conducted every 5 years to track population trends and the impacts of turbine-related fatalities in the APWRA.~~

~~Threshold 3~~

~~If postconstruction fatality monitoring results in a point estimate for total fatalities that exceeds the preconstruction baseline fatality estimates for 3 consecutive years for any focal species or species group (i.e., all focal species, all raptors, all non-raptors, all birds combined), then the following ADMMs will be implemented in addition to ADMM-1 through ADMM-3.~~

ADMM-5~~4~~: Turbine Curtailment. If postconstruction monitoring indicates patterns of turbine-caused fatalities—such as seasonal spikes in fatalities, topographic or other environmental features associated with high numbers of fatalities, or other factors that can potentially be manipulated and that suggest that curtailment of a specific turbine's operation would result in reducing future avian fatalities—the project operator ~~will~~ can curtail operations of the offending turbine or turbines. Curtailment restrictions would be developed in coordination with the TAC and based on currently available fatality data, use data, and research.

ADMM-6~~5~~: Cut-in Speed Study. ~~A statistically valid cut-in-speed study will~~Changes in cut--in speed could be conducted to see if changing cut-in speeds from 3 meters per second to 5 meters per second (for example) would significantly reduce avian fatalities. The proponent will coordinate with the TAC in ~~designing the study~~determining the feasibility of the measure for the particular species affected as well as the amount of the change in the cut-in speed. ~~. Should increasing the cut-in speed be shown to have positive results while bird fatalities beyond the threshold continue at other turbines, cut-in speed restrictions will be implemented.~~

ADMM-7~~6~~: Real-Time Turbine Curtailment. ~~(only if threshold for raptors is exceeded). If the above measures prove ineffective, then~~ T~~t~~he project proponent ~~will~~ can employ a real-time turbine curtailment program designed in ~~conjunction~~ consultation with the TAC. The intent ~~is~~ would be to deploy a biologist to monitor onsite conditions and issue a curtailment order when raptors are near operating turbines. Alternatively, radar, video, or other monitoring measures ~~may~~ could be deployed in place of a biological monitor if there is evidence to indicate that such a system would be as effective and more efficient than use of a human monitor.

E.1.11 Master Response 11—Bat Impacts and Mitigation

Several commenters expressed opinions regarding the analysis of impacts on bats. These comments can be broadly summarized by the categories listed below.

- Background information regarding bat fatality and monitoring, including more detailed comparisons between old- and new-generation turbines should be expanded, and presentation of bat fatalities should be standardized as fatalities/MW/year.
- Barotrauma associated with turbine blades has not been addressed as a cause of bat mortality.
- Survey protocols should be updated.
- Avoidance and minimization measures should be updated with more recent information, with specific reference to *Bird and Bat Movement Patterns and Mortality at the Montezuma Hills Resource Area* (Johnston et al. 2013).
- Adaptive management measures—particularly measures applied to turbines shown to be of high risk to bats—are insufficiently rigorous.

Bat Fatality and Monitoring

The discussion of Impact BIO-14a-1 on pages 3.4-125 through 3.4-127 of the Draft PEIR summarizes some of the hypotheses available in the literature about the relationship between bat biology and wind energy fatality risk. An expanded comprehensive summary of all literature on the topic would be beyond the scope of a PEIR and would lead the PEIR into speculation. The best available science indicates that migratory species are at disproportionate risk and that a high percentage of fatalities occur during the fall migration season. The specific reasons for these trends have not been conclusively determined, and thus cannot currently inform the design of specific mitigation requirements. What is known about wind turbine–bat interactions has been incorporated into Mitigation Measures BIO-14a (turbine siting) and BIO-14d (adaptive management—specifically, the seasonal turbine cut-in speed increase). The PEIR acknowledges the lack of conclusive information and the likely future developments in effective, proven adaptive management measures and requires that future measures be based on the latest, peer-reviewed science and incorporate emerging technology and methods.

Some comments point to the importance of providing a common metric as the basis of comparison between one wind energy facility and another, or between one timeframe and another, and suggest that this information be included in a more prominent location in the text. While baseline and predicted fatality estimates are provided as deaths/MW/year in the impact discussion section (3.4-126-27), the earlier discussion on observed fatality rates at old-generation turbines has been expanded and the range of existing mortality rates (deaths/MW/year) provided (see below for expansion to mortality rate discussion on 3.4-46). It is important to remember that the common metric can disguise lack of commonality in how that metric was generated, encouraging simplistic comparisons of non-comparable data.

Some comments suggest including more detail on the physical differences between old generation and fourth generation turbines, and what these differences might mean for bat fatality risk. The difference between bat fatality risk at new-generation turbines and old-generation turbines is certainly fundamental to the impact analysis for bats. However, to assign causative roles to physical differences between old-generation and new-generation turbines would be a matter of conjecture in the absence of controlled studies.

The reasons for the historically low fatality rates at old-generation turbines are unknown and relatively unstudied, and may simply be an artifact of monitoring programs that were not designed to detect and study bat fatality. With regard to including reference to old-generation turbines not having lights, studies have not shown a correlation between the presence of FAA lights required on new-generation turbines and bat fatality (Ellison 2012:11). The matter of potential differences in air pressure changes due to physical differences in the design of old and new generation turbines is discussed below in *Barotrauma*. One of the fundamental physical differences between old- and new-generation turbines that has been correlated with increased bat fatalities, at least in some studies, is tower height. The discussion of Impact Bio-14a-1 on pages 3.4-125 and 3.4-126 summarizes some of the hypotheses for increased blade collision risk to migratory bat species from fourth-generation turbines.

The discussion of *Bat Fatality and Monitoring* on page 3.4-46 of the Draft PEIR has been expanded as shown below.

> The APWRA supports habitat types suitable for maternity, foraging, and migration for special-status and common bats. Several of these species are susceptible to direct mortality through collision or other interactions with wind turbines. <u>Five species of bat have been documented as fatalities in the APWRA: little brown bat, California myotis, western red bat, hoary bat, and Mexican free-tailed bat (Table 3.4-6) (Insignia Environmental 2012:47–48; ICF International 2013:3-3). Hoary bats and Mexican free-tailed bats have made up the majority of documented fatalities; western red bat, another migratory species and a California species of special concern, has sustained the third highest number of documented fatalities.</u>~~Studies at wind energy facilities in North America generally show strong seasonal and species-composition patterns in bat fatalities, with the bulk of fatalities consisting of migratory species and occurring in late summer to mid-autu~~
>
> 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 of pre- and postconstruction acoustic survey data from the recently repowered Vasco Winds facility in the Contra Costa County portion of the APWRA documents the presence of four additional species (big brown bat, silver-haired bat, canyon bat, and Yuma myotis). Acoustic surveys indicated bat activity in all three seasons in which surveys were conducted, with a spike in activity in the fall (Pandion Systems 2010; Szewczak 2013). Mexican free-tailed bat and hoary bat comprised the majority of the acoustic detections (Pandion Systems 2010).
>
> <u>Relatively little is known about bat biology as it relates to fatality risk at wind energy facilities. Limited knowledge of such factors as migration, mating behavior, behavior around turbines, and seasonal movements impede efforts to predict risk of turbine collision.</u> <u>Studies at wind energy facilities in North America generally show strong seasonal and species-composition patterns in bat fatalities, with the bulk of fatalities consisting of migratory species and occurring in late summer to mid-autumn.</u> <u>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.</u>
>
> ~~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, due at least in part to the monitoring program's design, which has focused on bird mortality. Five species of bat have been documented as fatalities in the APWRA: little brown bat, California myotis, western red bat, hoary bat, and Mexican~~

~~free-tailed bat (Table 3.4-6) (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 documented fatalities; western red bat, another migratory species and a California species of special concern, has sustained the third highest number of documented fatalities.~~

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, due at least in part to the monitoring program's design, which has focused on bird mortality. As previous study methods were not designed to generate defensible bat mortality rates, and as new generation turbines may pose novel threats to bats, assumptions of species vulnerability based on extrapolation from the older turbine technologies present in the APWRA are not necessarily valid (California Bat Working Group 2006).~~Relatively little is known about bat biology as it relates to fatality risk at wind energy facilities. Limited knowledge of such factors as migration, mating behavior, behavior around turbines, and seasonal movements impede efforts to predict risk of turbine collisio~~

Calculating adjusted bat fatality rates at old generation turbines using data collected under the early avian monitoring program is problematic both because the sample size is low and because monitoring and analysis methods were not designed to detect and adjust for these types of fatalities. In their paper grappling with comparisons of fatality rates between old--generation turbines at the APWRA and early repowering projects, Smallwood and Karas (2009) illustrated these points by acknowledging that all of their old-generation bat fatality estimates are likely biased low (2009:1065)~~,~~ and that differences observed in comparisons of various bat fatality estimates, even those as seemingly significant as 800%, could not be statistically defended due to the small sample sizes involved (Smallwood and Karas 2009:1066–67).

Bat fatality rates available for old--generation turbines at the APWRA are as follows. For the earlier years, covering 1998–2002 and a combination of turbine models, nameplate capacities, and designs, Smallwood and Karas presented a bat fatality rate estimate of 0.115 (SE+- 0.073) bat deaths/MW/year (2009:-1066). For more recent old-generation turbine monitoring years (2005–2007), Smallwood and Karas presented a bat fatality rate estimate of 0.263 (SE+_0.172) bat deaths/MW/ year, (used as the baseline in this PEIR) (2009:1066).

Bat fatality rates documented at the three repowered projects in the APWRA vary. These rates were also generated using different search efforts and different adjustment calculations, making direct comparison problematic, despite the common metric reported. For the Diablo Winds Energy Project (2005–2007), Smallwood and Karas (2009:1067) reported a bat fatality rate estimate of 0.783 (SE+- 0.548)/MW/year; for the Buena Vista Wind Farm (2008-2010), Insignia Environmental (2012:ES-3) reported a bat fatality rate range of 0.48–1.08/MW/year, depending on calculation methods; for the first year of the Vasco Winds repowering project (2012–2013), Brown et al. (2013:35–36) reported a bat fatality rate range of 0.663 (SE+- 0.486) to 2.281 (SE+- 1.06)/MW/year, with the "best estimate" rate reported as 1.679 (SE+- 0.801)/MW/year (2013:39).

Consistent across all documented rates, though methods used to generate these rates vary, is that reported bat fatality rates increased when old-generation turbines were replaced by newer, larger turbines (Smallwood and Karas 2009:1068). Turbines used in future repowering projects are likely to be similar in size to the Vasco Winds turbines but much larger than the Diablo Winds and Buena Vista turbines in both overall size and rated nameplate capacity. In a meta-analysis of bat fatalities at numerous wind energy facilities in North America, Barclay et al. found that bat fatality increased exponentially with increasing turbine height (2007:384).

The limited data available for the program area and vicinity suggest the potential for similar species composition and temporal patterns of bat mortality to those that have been documented at the Vasco Winds repowering project and at other fourth-generation wind energy facilities, such as those in the Montezuma Hills Wind Resource Area.

Barotrauma

This avenue of inquiry was intentionally not pursued in the PEIR, as it was determined to be of limited application to the purpose of the PEIR for several reasons. (1) Barotrauma (internal damage caused by a shift in external air pressure) has not been conclusively accepted as a significant cause of bat fatality at wind energy facilities and has been deemed unlikely to be a primary causal factor by recent modeling studies, particularly at the wind speeds at which most bat fatalities occur (National Renewable Energy Lab National Wind Technology Center 2013). In a detailed study of bat carcasses found at a wind energy facility, Grodsky et al. (2011:922) noted that attribution of cause of death to a single factor was not possible even when each carcass was subject to an advanced battery of veterinary diagnostic techniques. Without knowing whether or to what degree pressure changes influence bat fatality, analyzing variations in localized air pressure changes between turbine models would not generate usable information. (2) Old-generation turbines in the APWRA consist of numerous turbine models with variations in turbine height, operation, and nameplate capacity. This range of variation would make an analysis of specific differences in air pressure effects between old- and new-generation turbines excessively problematic. In light of the lack of applicable data that would result, such an effort could not be justified in the scope of this PEIR. (3) The County is not aware of any mitigation measures that would apply to one proximate cause of death and not another. Whether death is caused by turbine blade strike or turbine-induced barotrauma, the current mitigation options remain the same, making proximate cause of death moot in the current mitigation-option landscape.

Survey Protocols

Two commenters questioned a provision suggesting that only roads and pads would be surveyed for bat fatalities. Other comments stated that the referenced acoustic sampling guidelines are out of date. In response to these comments, Mitigation Measure BIO-14b has been revised as shown at the end of this Master Response.

Avoidance and Minimization Measures

The article suggested by USFWS has been reviewed again for applicable avoidance and minimization measures. Johnston et al. (2013) describe observed patterns of bird and bat movements and activity at study sites in the Montezuma Hills Wind Resource Area using three tools available to monitor nighttime activity of birds and bats: radar, particularly altitude-specific radar; night-vision equipment; and passive acoustic monitoring. As the authors state (Johnston et al. 2013:90–91), the recommendations they put forward are for increased efforts to (1) determine more precisely how parameters such as “barometric pressure changes, wind direction and time of day” affect bat movement patterns at a given site to subsequently allow more specific turbine curtailment regimes than the blanket ones generally proposed; and (2) determine whether there is a relationship between the location of certain habitat features and the risk of bat fatality. Although monitoring factors such as wind direction and barometric pressure and the use of radar to monitor for high-risk bat activity are not explicitly identified in the Draft PEIR, such approaches are implicitly supported through the adaptive management approach, should scientifically defensible, conclusive results emerge in the future.

Adaptive Management

Some commenters stressed seasonal shutdowns, increased cut-in speeds, and curtailment of high-risk turbines.

Literature reviewed for this document did not agree with one commenter that cut-in speeds greater 5.0 m/s have proven to be ineffective. Weller and Baldwin (2011:11) noted that "Previous studies have documented that reducing cut-in wind speeds from approximately 3 m/s to approximately 6 m/s resulted in about half as many bat fatalities with relatively modest reductions in power production (Baerwald et al. 2009, Arnett et al. 2011)." Additionally, as noted by Johnston et al. 2013, while most bat fatalities show positive correlation with nights of low wind speed, the same is not necessarily true for Mexican free-tailed bats, known to be strong fliers. Johnston et al. (2013: 86–87) noted an increased probability of encountering a Mexican free-tailed bat fatality on nights with "stronger winds," that the association of bat fatality with lower wind speeds in North America "has involved studies conducted outside the range of the Mexican free-tailed bat," and that in European studies, "the strongest flier (*Nyctalus noctual*) of four species of at-risk, aerially foraging bats typically is killed during higher average wind speeds (Seiche 2008 in Rydell et al. 2011)." This correlation suggests a potential utility in increasing cut-in speeds beyond levels previously studied if significant fatalities of Mexican free-tailed bats are the target of mitigation actions. Mexican free-tailed bats are well represented in fatality data from both the repowered Vasco Winds project (Brown et al. 2013:23) and the nearby Montezuma Hills Wind Resource Area (Johnston et al. 2013:F-2, F-4).

Applying mitigation approaches, whether seasonal shutdown or cut-in speed increases, only to those turbines that are significantly more hazardous to bats than others would be the most cost-efficient and biologically effective approach. However, the identification of an individual turbine as having a significantly higher mortality rate is, in practice, extremely difficult. Experience has shown that a turbine with the highest mortality rate in one year will not necessarily have the highest rate in subsequent years, so annual variation must be taken into account. The required mortality monitoring period proposed in the PEIR is 3 years, which may not be sufficient to generate defensible proof that certain turbines are a significantly greater risk to bats. In addition, sample sizes are typically too small to identify statistically significant differences in the mortality rates from one turbine to the next.

Regarding the appropriateness of employing seasonal shutdown as a primary adaptive management mitigation measure, the cut-in speed adjustment (increasing the cut-in speed so that wind turbines do not operate in low wind when most bat species are most likely to be active) is the measure known to be effective for bats. Seasonal shutdowns as a first approach would certainly avoid bat fatality but would also avoid the purpose of the project for that time period, without knowing whether employing a complete shutdown would generate significantly less bat fatality than employing cut-in speed increases already described. Should cut-in speed increases and other approaches fail to reduce mortality, the County, under guidance from the TAC, has the ability to adjust adaptive management measures, and could consider seasonal shutdown if deemed appropriate.

Implicit to the adaptive management mitigation approach is the ability of the TAC to respond to scientifically sound site-specific data by implementing customized mitigation solutions. For a revised description of the composition and responsibilities of the TAC, please refer to Master Response 6. Revisions to Mitigation Measures BIO-14a, BIO-14b, and BIO-14d are shown below.

Mitigation Measure BIO-14a: Site and select turbines to minimize potential mortality of bats

All project proponents will use the best information available to site turbines and to select from turbine models in such a manner as to reduce bat collision risk. The siting and selection process will take into account bat use of the area and landscape features known to increase collision risk (trees, edge habitats, riparian areas, water bodies, and wetlands). Measures include but are not limited to siting turbines the greatest distance feasible up to 500 meters (1,640) feet from still or flowing bodies of water, riparian habitat, known roosts, and tree stands (California Bat Working Group 2006:6).

To generate site-specific "best information" to inform turbine siting and operation decisions, a bat habitat assessment and roost survey will be conducted in the project area to identify and map habitat of potential significance to bats, such as potential roost sites (trees and shrubs, significant rock formations, artificial structures) and water sources. Turbine siting decisions will incorporate relevant bat use survey data and bat fatality records published by other projects in the APWRA. Roost surveys will be carried out according to the methods described in Mitigation Measure-BIO-12a.

Mitigation Measure BIO-14b: Implement postconstruction bat fatality monitoring program for all repowering projects

A scientifically defensible, postconstruction bat fatality monitoring program will be implemented to estimate actual bat fatalities and determine if additional mitigation is required. Bat-specific modifications to the 3-year postconstruction monitoring program described in Mitigation Measure BIO-11g, developed in accordance with CEC 2007 and with appropriate recommendations from California Bat Working Group guidelines (2006), will be implemented.

In addition to the requirements outlined in Mitigation Measure BIO-11g, the following ~~two~~ bat-specific requirements will be added.

- Include on the TAC at least one biologist with significant expertise in bat research and wind energy impacts on bats.
- Conduct bat acoustic surveys concurrently with fatality monitoring in the project area to estimate nightly, seasonal, or annual variations in relative activity and species use patterns, and to contribute to the body of knowledge on seasonal bat movements and relationships between ~~acoustic~~ bat activity, environmental variables, and turbine fatality. Should emerging research support the approach, these data may be used to generate site-specific predictive models to increase the precision and effectiveness of mitigation measures (e.g., the season-specific, multivariate models described by Weller and Baldwin 2011:-11). Acoustic bat surveys will be designed~~,~~ and data analysis ~~will be~~ conducted~~,~~ by qualified biologists with significant experience in acoustic bat survey techniques. ~~in accordance with~~ Methods will be informed by the latest available guidelines (California Energy Commission guidelines, ~~(~~2007)~~,~~; California Bat Working Group guidelines, ~~(~~2006), except where best available science supports technological or methodological updates. High-quality, sensitive acoustic equipment will be used to produce data of sufficient quality to generate species identifications.~~and best available science to obtain data on species composition and season of occurrence and relative bat activity patterns over time.~~ Survey design and methods will be scientifically defensible and will include, at a minimum, the following elements.
    - Acoustic detectors will be installed at multiple stations to adequately sample range of habitats in the project area for both resident and migratory bats. The number and locations for acoustic monitoring will be developed in consultation with the TAC. The number of detector arrays installed per project site should incorporate emerging research on the density of detectors required to adequately meet sampling goals and inform mitigation approaches (Weller and Baldwin 2011:10).
    - Acoustic detector arrays will ~~be mounted on vertical structures to~~ sample multiple airspace heights including as close to the repowered rotor swept area as possible.~~.~~Vertical structures used for mounting may be preexisting or may be installed for the project (e.g., temporary or permanent meteorological towers).

- Surveys will be conducted such that data are collected continuously for a minimum of 90 days ~~from~~ between ~~early July~~mid-August ~~to~~ and ~~early~~ mid- November to cover the activity transition from maternity to migration season and determine if there is elevated activity during migration. Survey season may be adjusted to more accurately reflect the full extent of the local migration season~~,~~ and/or season(s) of greatest local bat fatality risk, if scientifically sound data support doing so.

- Anticipated adaptive management goals, such as determining justifiable timeframes to reduce required periods of cut-in speed adjustments, will be reviewed with the TAC and incorporated in designing the acoustic monitoring and data analysis program.

Modifications to the fatality search protocol will be implemented to obtain better information on the number and timing of bat fatalities (e.g., Johnston et al.~~,~~ 2013:-85). Modifications ~~may~~ will include decreases in the transect width and search interval for a period of time coinciding with high levels of bat mortality, i.e., the fall migration season (roughly August to early November, or as appropriate in the view of the TAC). The ~~need~~ nature of ~~for~~ bat-specific transect distance and search intervals will be determined in consultation with the TAC~~,~~ and will be guided by scientifically sound and pertinent data on rates of bat carcass detection at wind energy facilities (e.g., Johnston et al. 2013:-54–55) and site-specific data from APWRA repowering project fatality monitoring programs as these data become available.

Other methods to achieve the goals of the bat fatality monitoring program while avoiding prohibitive costs may be considered subject to approval by the TAC, if these methods have been peer reviewed and evidence indicates the methods are effective. For example, if project proponents wish to have the option of altering search methodology to a newly developed method, such as searching only roads and pads (Good et al. 2011:73), a statistically robust field study to index the results of the methodology against standard search methods will be conducted concurrently to ensure site-specific, long-term validity of the new methods.

~~One example of such an approach is to increase the efficiency of fatality searches by reducing the search plot to encompass only the gravel roads and pads around turbines, where bat fatalities may be easier to find. At one wind energy site in Indiana, this approach has generated comparable fatality estimates to those of standard search plots (Good et al. 2011:73).~~

Finally, detection probability trials will utilize bat carcasses to develop bat-specific detection probabilities. Care should be taken to avoid introducing novel disease reservoirs; such avoidance will entail using onsite fatalities or using carcasses obtained from within a reasonably anticipated flight distance for that species.

Mitigation Measure BIO-14c: Prepare and publish annual monitoring reports on the findings of bat use of the project area and fatality monitoring results

Annual reports of bat use results and fatality monitoring will be produced within 3 months of the end of the last day of fatality monitoring. Special-status bat species records will be reported to CNDDB.

Mitigation Measure BIO-14d: Develop and implement a bat adaptive management plan

In concert with Mitigation Measure BIO-14b, all project proponents will develop adaptive management plans to ensure appropriate, feasible, and current incorporation of emerging information. The goals of the adaptive management plans are to ensure that the best available science and emerging technologies are used to assess impacts on bats, and that impacts are minimized to the greatest extent possible while maximizing energy production.

The project-specific adaptive management plans ~~These plans~~ will be used to adjust operation and mitigation to incorporate the results of project area monitoring and new technology and research results when sufficient evidence exists to support these new approaches. These plans will be reviewed by the TAC and approved by the County. All adaptive management measures will be implemented within a reasonable timeframe, sufficient to allow the measures to take effect in the first fall migration season following the year of monitoring in which the adaptive management threshold was crossed. ADMMs may be modified by the County in consultation with the TAC to take into account current research, site-specific data, and the most effective impact reduction strategies. ADMMs will include a scientifically defensible, controlled research component and minimum post-implementation monitoring time to evaluate the effectiveness and validity of the measures. The minimum monitoring time will consist of three sequential fall seasons of the bat-specific mortality monitoring program covering the 3–4 months of the year in which the highest bat mortality has been observed: likely August–November. The start and end dates of the 3–4 months of bat-specific mortality monitoring period will be based on existing fatality data and in consultation with the TAC.

Determining a fatality threshold to trigger adaptive management is not straightforward, as insufficient information exists on the status and vitality of the populations of migratory bat species subject to mortality in the APWRA. The low estimate of anticipated bat fatality rates is from the Vasco Winds project in the APWRA. Applying this rate programmatically would result in an estimate of 21,000 bats killed over the 30-year life of the program. The high estimate is from the Montezuma Hills Wind Resource Area. Applying this rate programmatically would result in an estimate of 49,050 bats killed over the 30-year life of the program. Bats are slow to reproduce, and turbines may be more likely to kill adult bats than juveniles, suggesting that a conservative approach is warranted. Accordingly, an initial adaptive management threshold will be established using the low fatality estimates, or 1.679 fatalities/MW/year, to ensure that the most conservative trigger for implementation of adaptive management measures is adopted.

If postconstruction fatality monitoring results in a point estimate for the bat fatality rate that exceeds the 1.679 fatalities/MW/year threshold by a statistically significant amount, then, in consultation with the TAC, ADMM-7 and ADMM-8 (described below) for bats will be implemented.

It is important to note that neither the high nor the low estimate speaks to the ability of bat populations to withstand the associated levels of take. The initial fatality rate threshold triggering adaptive management may be modified by the TAC if appropriate and if such adaptation is supported by the best available science.

The TAC may direct implementation of adaptive management measures for other appropriate reasons, such as an unexpectedly and markedly high fatality rate observed for any bat species, or special-status species being killed in unexpectedly high numbers.

ADMMs for bats may be implemented using a stepped approach until necessary fatality reductions are reached, and monitoring methods must be revised as needed to ensure accurate measurement of the effectiveness of the ADMMs. Additional ADMMs for bats should be developed as new technologies or science supports doing so.

ADMM-7: Seasonal Turbine Cut-in Speed Increase. Cut-in speed increases offer the most promising and immediately available approach to reducing bat fatalities at fourth-generation wind turbines. Reductions in fatalities (53–87%) were observed when increasing modern turbine cut-in speed to 5.0–6.5 m/s (Arnett et al. 2009:3; Good et al. 2012:iii). While implementing this measure immediately upon a project's commencement would likely reduce bat fatalities, that assumption is not yet supported by conclusive data. Moreover, without establishing baseline fatality at repowered projects, there would be no way to determine the effectiveness of the approach or whether the costs of increased cut-in speeds (and consequent power generation reductions) were providing fatality reductions.

Cut-in speed increases will be implemented as outlined below, with effectiveness assessed annually.

- The project proponent will increase cut-in speed to 5.0 m/s from sunset to sunrise during peak migration season (generally August–October). If this is ineffective, the project proponent will increase turbine cut-in speed by annual increments of 0.5 m/s until target fatality reductions are achieved.
- The project proponent may refine site-specific migration start dates on the basis of pre- and postconstruction acoustic surveys and ongoing review of dates of fatality occurrences for migratory bats in the APWRA.

- The project proponent may request a shorter season of required cut-in speed increases with substantial evidence that similar levels of mortality reduction could be achieved. Should resource agencies and the TAC find there is sufficient support for a shorter period (as low as 8 weeks), evidence in support of this shorter period will be documented for the public record and the shorter period may be implemented.
- The project proponent may request shorter nightly periods of cut-in speed increases with substantial evidence from defensible onsite, long-term postconstruction acoustic surveys indicating predictable nightly timeframes when target species appear not to be active. Target species are here defined as migratory bats or any other species appearing repeatedly in the fatality records.
- The project proponent may request exceptions to cut-in speed increases for particular weather events or wind patterns if substantial evidence is available from onsite acoustic or other monitoring to support such exceptions (i.e., all available literature and onsite surveys indicate that bat activity ceases during specific weather events or other predictable conditions).
- In the absence of defensible site-specific data, mandatory cut-in speed increases will commence on August 1 and continue through October 31, and will be in effect from sunset to sunrise.

ADMM-8: Emerging Technology as Mitigation. The project proponent may request, with consultation and approval from agencies, replacement or augmentation of cut-in speed increases with developing technology or another mitigation approach that has been proven to achieve similar bat fatality reductions.

The project proponent may also request the second tier of adaptive management to be the adoption of a promising but not fully proven technology or mitigation method. These requests are subject to review and approval by the TAC and must include a controlled research component designed by a qualified principal investigator so that the effectiveness of the method may be accurately assessed.

Some examples of such emerging technologies and research areas that could be incorporated in adaptive management plans are listed below.

- The use of acoustic deterrents (Arnett et al. 2013:1).
- The use of altitude-specific radar, night vision and/or other technology allowing bat use monitoring and assessment of at-risk bat behavior (Johnston et al. 2013: 90-91) if research in these areas advances sufficiently to allow effective application of these technologies.
- Application of emerging peer-reviewed studies on bat biology (such as studies documenting migratory corridors or bat behavior in relation to turbines) that support specific mitigation methods.

E.2 Federal Agencies

FA-1—U.S. Fish and Wildlife Service

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Southwest Region
2800 Cottage Way, Suite W-2606
Sacramento, California 95825

In Response Reply To:
FWS/R8/MB&SP

Mrs. Sandra Rivera
County of Alameda
244 W. Winton Avenue, Room 111
Hayward, CA 94544

JUL 24 2014

Dear Mrs. Rivera,

The mission of the U.S. Fish and Wildlife Service (Service) is to work with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people. As part of this, we are charged with implementing statutes including the Endangered Species Act (7 U.S.C. § 1531 *et seq*.; ESA), Migratory Bird Treaty Act (16 U.S.C. § 703 *et seq*.; MBTA), and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; Eagle Act). We have reviewed Alameda County's Draft Program Environmental Impact Report: Altamont Pass Wind Resource Area Repowering (DPEIR). The DPEIR analyzes the anticipated approval by Alameda County of new Conditional Use Permits (CUPs) to allow new and repowered wind-farm uses in the Altamont Pass Wind Resource Area (APWRA). In this letter we have focused our comments on our legal mandate and trust responsibility to maintain healthy migratory bird populations for the benefit of the American public pursuant to the MBTA and the Eagle Act.

The MBTA prohibits the taking, killing, possession, transportation and importation of migratory birds, their eggs, parts, and nests, except when authorized by the Secretary of the Interior. Because the MBTA does not provide a specific mechanism to permit "incidental" take, it is important for proponents to work proactively with the Service to avoid and minimize take to the degree practicable. We recognize that some birds may be killed at renewable energy developments, even if all reasonable measures to avoid it are implemented.

The Eagle Act prohibits all take of eagles unless otherwise authorized by the Secretary of the Interior. A goal of the Eagle Act is to ensure that any take of bald eagles (*Haliaeetus leucocephalus*) or golden eagles (*Aquila chrysaetos*) is compatible with the preservation of each species, which the Service has interpreted as maintaining stable or increasing breeding populations. "Take" under the Eagle Act is defined as "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, disturb individuals, their nests and eggs..." "Disturb" was defined in 2007 (72 FR 31132) as "to agitate or bother a bald or golden eagle to a degree that causes…injury to an eagle, reduced productivity, or nest abandonment…" In 2009, two new permit rules were created for eagles. Regulation 50 CFR 22.26 can authorize limited take of bald and golden eagles when the take is associated with, but not the purpose of, an otherwise lawful activity, and cannot practicably be avoided. Take of eagles associated with the operation of wind energy facilities can be permitted under this authority.

FA-1—U.S. Fish and Wildlife Service

To ensure that any take of eagles does not exceed the Eagle Act's preservation standard, the Service set regional thresholds (i.e., upper limits) for take of each eagle species using methodology described in the Final Environmental Analysis (FEA) of the Eagle Permit Rule (Service 2009). We also put in place measures to ensure that local eagle populations are not depleted by take that would be otherwise regionally acceptable. As described in our *Eagle Conservation Plan Guidance Module 1: Land-based Wind Energy Version 2* (Service 2013, ECP Guidance), it is the Service's policy that take rates for a local-area population (140 miles for golden eagles) should not exceed 5% annually, whether the impacts of a given project have been offset by compensatory mitigation or not, to ensure sustainable populations of eagles.

In our Environmental Analysis for an eagle take permit at the Shiloh IV Wind Farm located about 30 miles from the APWRA (Service 2014), we determined that the current take rate for the APWRA golden eagle local-area population is approximately 12% annually. We are concerned that this level of ongoing take is having a negative effect on the local-area population of golden eagles and could affect the sustainability of this population. 1

Please contact Heather Beeler, Eagle Permit Coordinator at (916) 414-6651, if you have any questions.

Sincerely,

J. Erin Davis Jr.

Assistant Regional Director
Migratory Birds and State Programs

Attachment

FA-1—U.S. Fish and Wildlife Service

Literature Cited

U.S. Fish and Wildlife Service (Service). 2003. *Migratory Bird Permit Memorandum*. April 15. United States Department of the Interior, Fish and Wildlife Service, Washington, DC. Available: <http://www.fws.gov/policy/m0208.pdf>. Accessed July 18, 2014.

———. 2008. *Birds of Conservation Concern 2008*. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, VA. Available: http://www.fws.gov/migratorybirds/ . Accessed July 18, 2014

———. 2009. *Final Environmental Assessment. Proposal to Permit Take Provided under the Bald and Golden Eagle Protection Act.* U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Washington, DC.

———. 2012a. *U.S. Fish and Wildlife Service Land Based Wind Energy Guidelines.* March 23. June.

———. 2013. *Eagle Conservation Plan Guidance. Module 1: Land-based Wind Energy Development*. Version 2. April.

———. 2014. *Final Environmental Assessment for the Shiloh IV Wind Project Eagle Conservation Plan*. Division of Migratory Bird Management. Sacramento, CA. With technical assistance from ICF International, Sacramento, CA.

FA-1—U.S. Fish and Wildlife Service

Attachment

Summary Comments

Overall, the Service is supportive of the bird and bat biological mitigation measures and adaptive management conservation measures outlined in the DPEIR. Many of these measures are consistent with our permitting guidance and policies for eagles. We appreciate the County's efforts to provide a compatible process. Our detailed comments on the DPEIR and associated conditions are attached. 2

We are concerned that the DPEIR's avian fatality analysis methods may underestimate risk to the focal species (including golden eagles), other birds and bats. Our concern is based on the following: 3

1) As you acknowledged in the DPEIR, the Diablo Winds Project is not representative of the projects that are being built with newer turbine technology.
2) The Buena Vista Wind Project's mortality monitoring study implemented flawed carcass removal and observer bias trials; therefore it may not be appropriate to rely on conclusions from this mortality report.
3) The Vasco Wind Project's first year's mortality monitoring results only show that one golden eagle was taken in the first year of monitoring. Although the report on the second year of monitoring has not been completed yet, we know of four additional eagle mortalities reported during the second year of monitoring.

Due to inherent annual variation in eagle use and reproductive efforts in the area, relying on a single year of mortality data could result in under- or over-estimating impacts. The amount of raptor mitigation required in the DPEIR is based solely upon the Vasco Wind Project's first year mortality results. Averaging multiple years of mortality data would provide a more realistic impact assessment. Our attachment provides more specific recommendations on this topic.

Eagles will continue to be at risk throughout the APWRA. We encourage Alameda County to require wind operators to follow the Service's ECP Guidance (Service 2013) and to apply for programmatic eagle take permits. The Service regards adherence to our ECP Guidance, Final Land-Based Wind Energy Guidelines (Service 2012) and early communication and collaboration with the Service (which includes sharing records such as results of studies, audits, monitoring, eagle and bird protection plans and other useful documents) as evidence of due care with respect to avoiding, minimizing, and mitigating significant adverse impacts to bats and to species protected under the MBTA and Eagle Act. The available information is not conclusive that repowering alone, without additional minimization efforts will effectively reduce impacts to birds and bats at wind farms. The goal is to minimize impacts to eagles and other migratory birds and bats in the APWRA. To achieve that goal, we recommend removing lattice tower turbines, repowering in conjunction with careful siting using site-specific biological data and/or informed risk models, and continuing to collaborate with us. 4

The Service has three overall recommendations. First, we encourage Alameda County to require 5
wind operators to follow our ECP Guidance (Service 2013) and apply for programmatic eagle take permits. Second, we recommend that the County approve an alternative that would limit the 6
overall wind energy development in the APWRA to ensure ongoing take of golden eagles does

FA-1—U.S. Fish and Wildlife Service

5

not exceed 5% of the local-area golden eagle population. Based on our current estimate of ongoing take (47 eagles/year) in the entire APWRA (Alameda and Contra Costa Counties combined), we recommend that you approve an alternative that would limit the overall take within the entire WRA to less than 29 eagles/year. 6 cont.

Third, we recommend that the County not approve any new infill of turbines in undisturbed areas of prime grassland/golden eagle habitat until such time that ongoing take can be substantially reduced to a more sustainable level. 7

Detailed Comments

1. Page 3.4-1 & 3.4-2; Migratory Bird Treaty Act: Reference for protected bird list is outdated. Our updated list is available as of December 2, 2014 at: http://www.fws.gov/migratorybirds/regulationspolicies/mbta/List%20of%20MBTA%20Protected%20Species%20December%202013.pdf 8

2. Page 3.4-36; Golden Eagle: We recommend that the Final PEIR better summarize what is known about APWRA eagle populations. How many or how close is the nearest nest and/or nesting habitat to the project areas/specific projects? We recommend including: 9
    - A reference that Hunt (2006) found that this area hosts the highest known density of golden eagles in the world
    - Mention that California Natural Diversity Data Base (CNDDB) is a presence only, non-conclusive database
    - We recommend the species account for golden eagles include a summary of local-area eagle population from *Contra Costa Water District's Annual Monitoring of Golden Eagle Nesting Success on the Los Vaqueros Watershed* (reports available from 2001-2013) that we provided to you on July 8, 2014
    - Summary of the collaborative golden eagle monitoring study by U.S. Geological Survey, East Bay Parks and the Peregrine Fund that is ongoing
    - Summary of eagle behavior/use data for this geographic area: APWRA specific risk models, and APWRA Scientific Review Committee wind turbine siting guidelines developed specifically for the Altamont Pass.

3. Page 3.4-46; Bat Fatality Monitoring. Last paragraph. "Relatively little is known about bat biology as it relates to fatality risk and wind energy facilities." The Service recommends this section be updated to summarize literature on the topic. Specifically, we suggest the DPEIR incorporates bat fatality minimization and avoidance measures from the *CEC-500-2013-015 Report, Birds and Bat Movement Patterns and Mortality at the Montezuma Hills Resource Area.* http://www.solanocounty.com/civicax/filebank/blobdload.aspx?blobid=10104 10

4. Page 3.4-51 – 3.4-53; 11
    - Alameda County has a responsibility to address impacts to all birds, not just focal species and special status species. We recommend at least summarizing impacts to various guilds of birds, focusing on guilds that are anticipated to be most affected by the wind facilities, such as raptors and migratory passerines.

FA-1—U.S. Fish and Wildlife Service

- Avian fatality analysis methods: The quality of carcass removal and observer bias studies greatly influences fatality estimate results. Therefore, we recommend also calculating carcass detection probability using, or at least incorporating, the APWRA Scientific Research Committee's QAQC Study and other relevant studies conducted recently. 12

5. Page 3.4-86; Mitigation Measure Bio-8a-1, Preconstruction nest surveys should occur within 24 hours of construction activities. We recommend using the Utah Raptor Guidelines to establish buffers for all raptors EXCEPT eagles. 13

6. Surveys should be conducted to locate eagle nests in appropriate habitat within 2 miles of any construction activities. We recommend a one-mile no disturbance buffer be implemented for construction activities (including road construction) to protect nesting birds from disturbance. In coordination with the Service, that buffer may be reduced to ½ mile if disturbance activities are not within direct line of sight of a given nest. 14

7. To minimize risk to eagles or loss of a breeding territory, the Service recommends no turbine be sighted within 2 miles of an active or alternative eagle nest in an active golden eagle territory. Eagles often have alternate nests that they rotate their nesting activities between. Eagle nest surveys should be conducted prior to sighting turbines and again immediately prior to construction activities. 15

8. Page 3.4-98; Impact BIO-11a-1 16
The analysis should consider impacts to all birds, not just focal raptors and rare, special status species.

9. Table 3.4-11; 350 Burrowing Owl mortalities at the repowered Diablo Winds project continue to be high. If this mortality rate continues, the local population may be extirpated in the foreseeable future. We recommend that the County include measures to reduce mortalities of owls at the Diablo Winds project and ensure any future repowered project's impacts to Burrowing Owls are minimized to the extent practicable. 17

10. Page 3.4-105; Mitigation Measure Bio-11f: As noted in your DPEIR, rock piles may provide ground squirrel habitat. The Service recommends rock piles be moved at least 500 meters away from turbines. 18

11. Page 3.4-106; Bio-11g; Technical Advisory Committee (TAC): We suggest that wind operators collectively provide a single qualified biologist to be their appointed TAC representative, instead of each project having a representative. Alternatively, we suggest that the wind operator's TAC representative be a non-voting member of the TAC. 19

12. Page 3.4-107; Bio-11h; The Service is supportive of this suite of Conservation Measures. Some of these requirements are consistent with the Service's requirements to qualify for a Programmatic Eagle Take Permit under the Eagle Act. Where DPEIR mentions our USFWS ECP Guidance, it should include a citation and reference in the Literature Cited. 20

FA-1—U.S. Fish and Wildlife Service

7

13. Page 3.4-108; The amount of raptor mitigation that would be required under the DPEIR is based solely upon the Vasco Wind Project first year mortality results. We believe that this data underestimates ongoing impacts. We recommend this value be updated with current data in the Final PEIR. At a minimum, we recommend updating the risk analysis and mitigation calculation methods in the Final PEIR using the Vasco Wind Project's second year's mortality report due to be released in August 2014. In addition, we recommend you include a re-evaluation of the mitigation calculation each year, based on averaging the most recent mortality report with prior (up to 3) years' data. 21

14. Page 3.4-111; Bio-11i, Implement an avian adaptive management program. The Service is supportive of an adaptive management program to be implemented if/when a take threshold has been exceeded. 22
    - ADMM-1: The Service recommends reframing this measure to allow the TAC the flexibility to incorporate the most recent information available. Research is ongoing to identify and test technologies to minimize impacts to avian species. The TAC should be allowed to advise the County using the most relevant visual modifications or audio/visual deterrence methods based upon the most recent information available.
    - ADMM-2: The Service advises caution when considering the use of perch deterrents. Perch deterrents should not be used on electric utility poles, since they often put eagles and other raptors at greater risk of being electrocuted than poles without deterrents. Further, perch deterrents on other structures are often not effective and serve to provide structures for birds' nests. PacifiCorp conducted avian risk assessment surveys of over 120,000 distribution poles from 2001 to 2012 in Utah, Wyoming, Idaho, Oregon, Washington, and California (Liguori 2013). During these surveys, raptor/raven perching was observed two times more frequently on poles with perch deterrents compared to poles without deterrents. Likewise, evidence of raptor use at poles (e.g., pellets, prey remains, whitewash) was 1.3 times greater at poles with perch deterrents compared to poles without deterrents. Perch deterrents poles were also associated with increased electrocution mortality rates (3.6 times greater) and increased raptor/raven nesting on poles (4 times greater). Because of these unintended consequences, the company removed perch deterrents from its avian protection standards. 23

15. Page 3-4-130; ADMM-7: In this section of the document, it is not clear whether the 1.679 fatalities/MW/year is an average for the entire area or on an individual facility basis. In order to ensure that the effects of poorly placed turbines can be minimized, we recommend having a measure that would allow individual turbines to have more restrictive conditions (i.e. higher cut-in speed) if that turbine or turbines are found to have significantly higher fatality rates than others in the facility. 24

E.2.1 Comment Letter FA-1—U.S. Fish and Wildlife Service

Response to Comment FA-1-1

The commenter, the U.S. Fish and Wildlife Service (USFWS), outlines the agency's legal authorities over migratory birds under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) and outlines the current permit rule created for eagles in 2009, noting that the take of eagles associated with the operation of wind turbines can be permitted under this authority. The commenter also notes USFWS's policies regarding preservation of local eagle populations including the establishment of regional thresholds for take—in this case, 5% or less of a local-area population annually. The commenter also notes that USFWS completed a recent analysis for an eagle take permit for a wind project near the APWRA, determined that the current take rate for the APWRA is approximately 12% of the local-area population annually, and remains concerned regarding this level of ongoing take. The County appreciates USFWS's review of the PEIR and its recent efforts to implement a permit program for the lawful take of eagles. While the County does not have the responsibilities that USFWS has under BGEPA, the County has worked diligently for many years to reduce ongoing impacts on eagles as well as other migratory birds. As outlined in the PEIR, the County believes that repowering the APWRA is an effective measure to reduce impacts on eagles as well as migratory birds. Table 3.4-11 on page 3.4-99 and Table 3.4-12 on page 3.4-113 of the Draft PEIR outline the expected reductions of mortality for most avian species, including golden eagles. Additionally, as noted in Master Response 4, additional information is now available regarding the golden eagle fatality rate at the Vasco Wind Project. This information has been incorporated into the Final PEIR, and while the new data slightly changes the projected impacts of repowered projects, the County notes that repowering is still expected to result in a reduction in impacts on most species, including golden eagles. Regardless of this expected reduction, the County has determined that repowering projects would continue to affect golden eagles as well as other migratory birds, concluding that these impacts are significant and unavoidable even after implementation of mitigation measures.

Response to Comment FA-1-2

The commenter notes that, overall, USFWS is supportive of the bird and bat mitigation measures and adaptive management conservation measures outlined in the PEIR. The County appreciates USFWS's review of the PEIR and its recent efforts to implement a permit program for the lawful take of eagles, as well as the recent development of USFWS's *Land-Based Wind Energy Guidelines*.

Response to Comment FA-1-3

Please see Master Response 4, *Estimated Avian Mortality Rates Methodology*, for a response to this comment.

Response to Comment FA-1-4

The commenter notes that eagles will continue to be at risk in the APWRA, and encourages wind operators to follow USFWS's Eagle Conservation Plan (ECP) Guidance and to apply for eagle take permits. Additionally, the commenter notes that repowering alone may not be sufficient to reduce impacts on birds and bats at windfarms and recommends removal of lattice tower turbines, careful siting, and continued collaboration with USFWS. The County concurs with USFWS and acknowledges in the PEIR that eagles will continue to be at risk in the APWRA following repowering. While the

County cannot require applicants to apply for eagle take permits, many of the PEIR mitigation measures were modeled after the avoidance, minimization, and mitigation measures outlined in USFWS's ECP Guidance. Additionally, Mitigation Measure BIO-11h, beginning on page 3.4-107 of the Draft PEIR, presents several mitigation options, including an option for applicants to use a USFWS-approved ECP and Bird and Bat Conservation Strategy (BBCS), for achieving compensatory mitigation requirements. The County believes that including this option may provide incentive for wind operators to apply for eagle take permits. The County is also supportive of USFWS's recommendations to remove lattice tower turbines and implement careful siting of repowered turbines. Mitigation Measure BIO-11c on page 3.4-104 of the Draft PEIR requires the use of turbine designs that reduce avian impacts, such as tubular towers with internal ladders and no external catwalks, railings, or ladders. Lastly, the County is also supportive of USFWS's recommendation to conduct careful siting of repowered turbines to minimize avian impacts and has included Mitigation Measure BIO-11b, on page 3.4-104 of the Draft PEIR and as revised in Response to Comments FA-1-14 and FA-1-15, to require careful siting of turbines using the best available information to reduce avian collision risk.

Response to Comment FA-1-5

As noted in Response to Comment FA-1-4, the County cannot require applicants to apply for eagle take permits; however, the mitigation measures in the PEIR are modeled after USFWS's ECP Guidance, and the County believes the compensatory mitigation measures may provide incentive for applicants to apply for eagle take permits.

Response to Comment FA-1-6

The commenter requests that the County approve an alternative that would limit wind energy development so that ongoing take of golden eagles does not exceed 5% of the local-area golden eagle population. The commenter also notes that, based on the current estimates of take, such an alternative would limit the overall take to less than 29 eagles each year. As noted in Response to Comment FA-1-1, the County believes that repowering the APWRA is an effective measure to reduce impacts on eagles as well as migratory birds. Additionally, as noted in Master Response 4, the County has updated the estimated golden eagle fatality rate at the Vasco Wind Project to include the results of the second year of fatality monitoring, which became available following the publication of the Draft PEIR. The County believes that approximately 158 MW of generation capacity has been constructed or approved in the Contra Costa County portion of the APWRA as of preparation of the Final PEIR. The County concludes that, considering the Contra Costa wind projects in combination with program Alternative 2 (450 MW), the entire Altamont Pass area (that is, the program area as described in the PEIR considered together with the Contra Costa County portion of the APWRA) could ultimately support up to 608 MW of generation capacity. Using the 2-year average fatality rate for golden eagles from the Vasco Wind Project—0.03 eagles/MW/year—the County has determined that approximately 18 eagles/year could be killed with repowering of the entire Altamont Pass area. Although it remains a significant impact, this number is well below USFWS's stated target. While the County is not required to adopt an alternative that limits overall take of golden eagle, the County believes that repowering the program area under either of the proposed alternatives is an effective strategy to reduce impacts on golden eagles. Lastly, the County notes that Mitigation Measure BIO-11h requires each project to compensate for the loss of individual raptors, including golden eagles, through a combination of conservation measures.

Response to Comment FA-1-7

As noted in Response to Comment FA-1-6, the County believes that either of the program alternatives analyzed in the Draft PEIR will reduce impacts on golden eagles to fewer than 29 eagles per year for the entire APWRA. As discussed in that response, using the latest available data from the Vasco Winds project, the anticipated take of eagles for the entire APWRA following complete repowering would be approximately 18 eagles/year.

Response to Comment FA-1-8

The commenter points out that the reference for birds protected under the MBTA is outdated, and provides the correct reference. The description of the Migratory Bird Treaty Act on pages 3.4-1 and 3.4-2 of the Draft PEIR has been revised as shown below.

> 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~~November 1, 2013 *Federal Register* (~~75~~78 FR 65844–65864~~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. Take of nongame migratory birds cannot be authorized through the MBTA for the program or Patterson Pass and Golden Hills projects. 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.

Response to Comment FA-1-9

The commenter requests that updated sources of information be incorporated into the *Golden Eagle* species account. The text of that account on pages 3.4-36 and 3.4-37 has been revised as shown below.

> Golden eagle is fully protected under the California Fish and Game Code and is an APWRA focal species. It is also protected by the MBTA, the BGEPA, and several sections of the California Fish and Game Code.
>
> Golden eagle is a year-round resident throughout much of California. The species does not breed in the center of the Central Valley but breeds in much of the rest of the state. Golden eagles typically occur in rolling foothills, mountain areas, sage-juniper flats, and deserts (Zeiner et al. 1990a:142–143). In California, golden eagles nest primarily in open grasslands and oak (*Quercus* spp.) savanna but will also nest in oak woodland and open shrublands. Golden eagles forage in open grassland habitats (Kochert et al. 2002:6). Preferred territory sites include those that have a favorable nest site, a dependable food supply (small to medium~~ to large~~ mammals, including ground squirrels, 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 1990:262). In the interior central Coast Ranges of California, golden eagles favor open grasslands and oak savanna, with lesser numbers in oak woodland and open shrublands. In the Diablo Range of California, all except a few pairs nest in trees in oak woodland and oak savanna habitats due to a lack of suitable rock outcrops or cliffs. Nest tree species include several oak species (*Quercus* spp.), foothill pine (*Pinus sabianiana* and *P. coulteri*), California bay laurel (*Umbellularia californica*),

eucalyptus (*Eucalyptus* spp.), and western sycamore (*Platanus racemosa*). A few pairs of eagles nest on electrical transmission towers traversing grasslands (Hunt et al. 1999:13).

Suitable nesting and foraging habitat for golden eagle is present in the program area. The APWRA has been reported to contain a higher density of golden eagles than anywhere else in the world (Hunt and Hunt 2006). The Predatory Bird Research Group estimated that at least 70 active golden eagle territories existed within 19~~20~~ miles of the program area, based on annual surveys from January 1994 to December 1997 (Hunt et al. 1999). These territories were resurveyed and occupancy verified in 2005 (Hunt and Hunt 2006). ~~The CNDDB includes 18 occurrences of golden eagles within 10 miles of the Project Area. The majority of these records are located to the northwest of the Project Area around Los Vaqueros Reservoir. Nine of the occurrence records documented nesting pairs of golden eagles during at least one breeding season between 2005 and 2008 (California Department of Fish and Wildlife 2013c).~~ The golden eagle population within 19 miles of the APWRA includes seven golden eagle territories/breeding areas within the Los Vaqueros watershed. Nest surveys and monitoring have been conducted within the watershed from 1994 to 2013, and 26 golden eagle nest structures have been documented during this period. Six of the seven breeding areas were occupied by golden eagle pairs during 2013~~.~~ (California Environmental Services 2014~~.~~). Moreover, EBRPD reported three historic and one recent golden eagle nests within the program area and two additional nests within 2 miles of the program area (Barton pers. comm.). There are no CNDDB records of golden eagle nests within the program area; however, there are 10 records of nests within 3.5 miles north and northwest of the program area (California Department of Fish and Wildlife 2013c). In early 2014, ground-based surveys for golden eagles were initiated in an expanded area to collect information on site occupancy and nesting success of the broader population of golden eagles in the Diablo Mountains. This study is a collaborative effort led by the U.S. Geological Survey, with the overall objective being to develop and evaluate survey and monitoring methods for estimating trends in occurrence and nesting success of golden eagles (U.S. Geological Survey 2013). The results of the 2014 surveys have not yet been published.

Golden eagle is unlikely to nest at Patterson Pass because the larger willow trees present are located in a deep ravine and do not offer an open view of the landscape. Suitable nesting habitat for golden eagle may be present in the Golden Hills project area, and golden eagles may forage in either project area. The CNDDB lists no occurrences of golden eagle nests in either project area (California Department of Fish and Wildlife 2013c).

Research of the golden eagle population in the APWRA has revealed it to be stable but with reduced resilience due to turbine-related mortality. Hunt (2002) examined data collected over a 7-year period between 1994 and 2002 that included the monitoring of 60–70 active territories within 30 kilometers (19 miles) of the APWRA. In 2005, these territories were found still to be 100% occupied (Hunt and Hunt 2006). The conclusions of these studies were that the golden eagle population in the APWRA region remains stable (Hunt 2002; Hunt and Hunt 2006). In addition, the studies found no increase in the number of actively breeding subadults, indicating that there are enough floaters to buffer any loss of breeding adults (Hunt 2002; Hunt and Hunt 2006). The conclusion of a stable golden eagle population in the APWRA vicinity was supported by the results of a population dynamics model that used reproduction rates and fatality rates, among other variables (Hunt 2002). However, the model results also suggested that the number of estimated annual fatalities used in the model, 50 individuals, could not be sustained by the number of breeding adults when considering the loss of reproductive potential incurred by each eagle fatality (Hunt and Hunt 2006). Although the vacant territories are filled by floaters and subadults to stabilize the APWRA population, the APWRA vicinity can be considered a population sink because the population demands a flow of recruits from outside the area to fill breeding vacancies as they occur.

Hunt and Hunt (2006) recommended future studies of the APWRA golden eagle populations to better understand long-term trends. The U.S. Geological Survey is currently conducting a population inventory in the APWRA region (U.S. Geological Survey 2013) to build on previous research by expanding surveys of territory occupancy and nesting success to include the broader population of golden eagles in the Diablo Mountains. The objectives of the study are to (1) estimate the breeding and nonbreeding population and measure reproductive success, (2) evaluate golden eagle detectability based on temporal and survey methodology factors, and (3) recommend strategies for improving golden nesting success and methods to monitor trends (U.S. Geological Survey 2013). This study will help to inform future management of golden eagles in the APWRA and surrounding region.

In response to the comment regarding the data available in the CNDDB, the first paragraph of *Special-Status Species* on page 3.4-24 of the Draft PEIR has been revised as shown below.

Based on the USFWS species list (U.S. Fish and Wildlife Service 2013); CNDDB (California Department of Fish and Wildlife 2013c) records search for the quadrangles overlapping the program area (Altamont, Cedar Mountain, Byron Hot Springs, Clifton Court Forebay, and Midway); and fatality records from APWRA fatality monitoring, 36 special-status wildlife species were identified as having potential to occur in the program area. Of these 35 species, 9 were determined to have low or no potential to occur in the program area and are not discussed further (Table 3.4-5); 26 of the 35 species are known to occur or have a moderate to high likelihood of occurring within the program area because suitable habitat is present (longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle [*Desmocerus californicus dimorphus*], curved-foot hygrotus diving beetle, California tiger salamander, western spadefoot [*Spea hammondii*], California red-legged frog, foothill yellow-legged frog [*Rana boylii*], western pond turtle, Blainville's [coast] horned lizard, Alameda whipsnake, San Joaquin coachwhip [*Masticophis flagellum ruddocki*], white-tailed kite, northern harrier, Swainson's hawk, golden eagle, western burrowing owl, loggerhead shrike, tricolored blackbird, little brown bat, western red bat, hoary bat, pallid bat, American badger, and San Joaquin kit fox). In addition to these 26 species, three species (bald eagle, Townsend's big-eared bat, and silver-haired bat) were added to this table based on suitable habitat conditions and professional judgment. It should be noted that the CNDDB is a presence--only database that depends on voluntary submission of species location data and is not a complete database of species locations.

Regarding the commenter's request for a summary of eagle behavior/use data and APWRA-specific risk models, the County points out that there are no specific risk models for the APWRA. In response to the commenter's request that reference to the SRC's turbine siting guidelines be added to the document, the second paragraph of *Avian Mortality and Monitoring* on page 3.4-45 of the Draft PEIR has been revised as shown below.

Until recently, attempts to reduce avian fatalities in the APWRA have focused primarily on two management actions: the shutdown of turbines during the winter period when use of the area by red-tailed hawks, golden eagles, and American kestrels is highest, and the removal of turbines determined to pose the highest collision risk based on history of fatalities, topographic position of the turbine, and other factors (Smallwood and Spiegel 2005a, 2005b, 2005c; ICF International 2013). While these actions have met with some success, their effectiveness has been less than ~~predicted~~ expected for reasons that are not yet clear. However, an increasing body of evidence suggests that repowering—in this case the replacement of numerous older, smaller turbines with fewer newer, larger turbines—could result in a substantial reduction in avian fatalities. Using the first few years of data from the Alameda County Avian Fatality Monitoring Program, Smallwood and Karas (2009) concluded that the most effective way to reduce turbine-related avian fatalities in the APWRA is to repower. Evidence collected to date from the three sites in the APWRA that have been repowered suggests that the larger modern turbines cause substantially fewer turbine-related avian fatalities than the older generation turbines (Brown et al. 2013; ICF International 2013), although it should be pointed out that two of the three sites involved had much smaller turbines than those proposed for use in the program. The Scientific Review Committee (SRC) for the APWRA has also produced guidelines for siting wind turbines to reduce avian fatalities in the APWRA. The SRC evaluated topographic, wind pattern, bird behavior, and turbine siting variables related to hazardous conditions to provide guidance to the wind companies to reduce avian collision hazards (Alameda County Scientific Review Committee 2010).

Response to Comment FA-1-10

For a response to this comment, please see Master Response 11, *Bat Impacts and Mitigation.*

Response to Comment FA-1-11

The commenter notes that the County has a responsibility to address impacts on all birds—not just focal species and special-status species. The County notes that Table 3.4-11 on page 3.4-99 and Table 3.4-12 on page 3.4-113 of the Draft PEIR provide estimated numbers of fatalities for all raptors as well as all native non-raptors (i.e., all birds). Additionally, the discussions of native non-raptors on pages 3.4-103 and 3.4-117 discuss the anticipated impacts on native non-raptors as a separate group distinct from raptors and other special-status species. The County also notes that the PEIR finds impacts on native non-raptors significant and unavoidable, even after the implementation of mitigation measures BIO-12a through BIO-12j. Since the PEIR treats native non-raptors as a group, the PEIR does not present potential impacts on native non-raptor species individually.

Response to Comment FA-1-12

The commenter recommends also calculating carcass detection probability using, or at least incorporating, the APWRA Scientific Research Committee's QA/QC Study and other relevant studies conducted recently. Pages 3.4-51 through 3.4-54 of the Draft PEIR outline the avian fatality analysis methods. The methods on those pages essentially note that the County used existing fatality rates from several sources to compare the existing fatality rates to the estimated fatality rates after repowering. The fatality data on which the analysis was based was informed by the carcass detection probability data available for the years in which detection probability was evaluated. The Draft PEIR already uses the best available, already published, and peer-reviewed estimates of fatalities for existing and repowered projects in the APWRA. Please see also Master Response 5, *Avian Fatality Monitoring Methodology*.

Response to Comment FA-1-13

The commenter suggests conducting preconstruction nest surveys within 24 hours of the start of construction activities. Mitigation Measure BIO-8a requires nesting bird surveys within 7 days prior to the start of construction activities because conducting preconstruction nest surveys within 24 hours of construction would not allow sufficient time to coordinate with the wildlife agencies and implement protective measures prior to the start of construction. Because the measure requires coordination with USFWS and CDFW when determining nest buffers, these agencies will be able to recommend larger buffer areas if warranted. The County feels that the measure protects nesting birds, while taking into consideration the factors that inform the nest buffer distance (e.g, existing level of disturbance, biology of the bird, topography, line of sight, type of construction activity). The text of Mitigation Measure BIO-8a has been revised as shown below to include a larger survey area for raptors and the potential for a larger buffer area, if necessary.

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

Where suitable habitat is present for raptors within 1 mile (within 2 miles for golden eagles) and for tree/shrub- and ground-nesting migratory birds (non-raptors) within 50~~0~~ feet of proposed work areas, the following measures~~, consistent with measures developed in the EACCS,~~ will be implemented to ensure that the proposed project does not have a significant impact on nesting special-status and non–special-status birds.

- Remove suitable nesting habitat (shrubs and trees) during the non-breeding season (typically September 1–January 31) for nesting birds.
- To the extent feasible, avoid construction activities in or near suitable or occupied nesting habitat during the breeding season of birds (generally February 1–August 31).
- 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 ~~500-foot~~1-mile buffer will be surveyed for tree-nesting raptors (except for golden eagles), and a 50-foot buffer will be surveyed for all other bird species.
- Surveys to locate eagle nests within 2 miles of construction will be conducted during the breeding season prior to construction. A 1-mile no-disturbance buffer will be implemented for construction activities to protect nesting eagles from disturbance. Through coordination with USFWS, the no-disturbance buffer may be reduced to 0.5 mile if construction activities are not within line-of-sight of the nest.
- If an active nest (other than golden eagle) is identified near a proposed work area and work cannot be conducted outside the nesting season (February 1–August 31), a no-activity zone will be established around the nest by a qualified biologist in coordination with USFWS and/or CDFW. Fencing and/or flagging will be used to delineate the no-activity zone. To minimize the potential to affect the reproductive success of the nesting pair, the extent of the no-activity zone will be based on the distance of the activity to the nest, the type and extent of the proposed activity, the duration and timing of the activity, the sensitivity and habituation of the species, and the dissimilarity of the proposed activity to background activities. The no-activity zone will be large enough to avoid nest abandonment and will be between 50 feet and ~~1,000 feet~~1 mile from the nest, or as otherwise required by USFWS and/or CDFW.

Response to Comments FA-1-14 and FA-1-15

The commenter suggests that surveys for eagle nests should be conducted within 2 miles of any construction activities and recommends a 1-mile no-disturbance buffer from any identified nests. The commenter further recommends that no turbine be sited within 2 miles of an active or alternative golden eagle nest. The text of Mitigation Measure BIO-8a has been revised as shown in Response to Comment FA-1-13. Mitigation Measure BIO-11b has been revised as shown below to incorporate these recommendations.

Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds

~~Micro-s~~Siting of turbines—using analyses of landscape features and location-specific bird use and behavior data to identify locations with reduced collision risk—may result in reduced fatalities (Smallwood et al. 2009). All project proponents will conduct a siting process and prepare a siting analysis to select turbine locations to minimize potential impacts on bird and bat species. Proponents will utilize existing data as well as collect new site-specific data as part of the siti~~t~~ng analysis.

Project proponents will utilize currently available guidelines such as the Alameda County SRC guidelines for siting wind turbines (Alameda County SRC 2010) and/or other currently available research or guidelines to conduct siting analysis. Additionally, project proponents will use the results of previous siting efforts to inform the analysis and siting methods as appropriate such that the science of siting continues to be advanced. All project proponents will collect field data that identify or confirm the behavior, utilization, and distribution patterns of affected avian and bat species prior to the installation of turbines.

Project proponents will collect and utilize available existing information, including but not necessarily limited to: siting reports and monitoring data from previously installed projects; published use and abundance studies and reports; and topographic features known to increase collision risk (trees, riparian areas, water bodies, and wetlands).

Project proponents will also collect and utilize additional field data as necessary to inform the siting analysis for golden eagle. As required in Mitigation Measure BIO-8a, surveys will be conducted to locate golden eagle nests within 2 miles of proposed project areas. Siting of turbines within 2 miles of an active or alternative golden eagle nest or active golden eagle territory~~,~~ will be based on a site-specific analysis of risk based on the estimated eagle territories, conducted in consultation with USFWS.

Project proponents will utilize methods (i.e., computer models) to identify dangerous locations for birds and bats based on site-specific risk factors informed by the information discussed above. The project proponents will compile the results of the ~~micro-~~siting analyses for each turbine and document these in the project-level APP, along with the specific location of each turbine.

Response to Comment FA-1-16

The commenter notes that the avian analysis on page 3.4-98 of the Draft PEIR should consider impacts on all birds, not just focal raptors and rare, special-status species. Please see Response to Comment FA-1-11 and Master Response 7, *Migratory Bird Treaty Act*, for a response to this comment.

Response to Comment FA-1-17

The commenter notes that burrowing owl mortalities at the repowered Diablo Winds project continue to be high and recommends that the County include measures to reduce impacts at that site and other repowered projects. The County notes that because the Diablo Winds project is an existing, already approved and operating project, measures in the PEIR would not apply to that project. For future repowered projects, impacts on burrowing owl are expected to increase slightly as described in the discussion of *Burrowing Owl* on page 3.4-100 of the Draft PEIR. However, as the discussion points out, there is some uncertainty regarding the level of expected impacts: using the Vasco Winds fatality rate produces a significant decrease, using the Diablo Winds fatality rate produces an increase. The County notes that environmental analysis for future repowering projects would be tiered from this PEIR, and would be based on additional monitoring data available at that time, which may provide better estimates of burrowing fatalities. Despite the uncertainties surrounding the burrowing owl impact estimates, the Draft PEIR finds impacts to burrowing owl as significant and unavoidable. Additionally, the County notes that Mitigation Measure BIO-11h on page 3.4-107 of the Draft PEIR requires compensatory mitigation for each individual raptor fatality, which would include burrowing owl.

Response to Comment FA-1-18

The County concurs with the commenter's recommendation that boulder piles be at least 500 meters (1,640 feet) from turbines. The second bullet of Mitigation Measure BIO-11f on page 3.4-106 of the Draft PEIR has been revised as shown below.

- Boulders (rocks more than 12 inches in diameter) excavated during project construction may be placed in aboveground piles in the project area so long as they are more than ~~200~~ 500 ~~yards~~ meters (~~656~~ 1,640 feet) from any turbine. Existing rock piles created during construction of first- and second-generation turbines will also be moved at least ~~200~~ 500 ~~yards~~ meters (1,640 feet) from turbines.

Response to Comment FA-1-19

For a response to this comment, please see Master Response 6, *Technical Advisory Committee*.

Response to Comment FA-1-20

The commenter notes that USFWS is supportive of the suite of conservation measures under Mitigation Measure BIO-11h and requests that the PEIR include a citation for their ECP Guidance whenever the guidance is mentioned in the document. The County appreciates USFWS's support of the conservation measures in the PEIR. The Final PEIR includes the correct reference to USFWS's ECP Guidelines when it occurs in the document (U.S. Fish and Wildlife Service. 2013. *Eagle Conservation Plan Guidance Module 1—Land-Based Wind Energy*. Version 2. April. Division of Migratory Bird Management. Available: http://www.fws.gov/windenergy/eagle_guidance.html. Last updated: June 27, 2014.)

Response to Comment FA-1-21

The commenter notes that the amount of raptor mitigation required in the Draft PEIR is based on the Vasco Winds project first-year mortality results and that these data underestimate ongoing impacts. The commenter recommends that the County update the FEIR to include data from the second year of monitoring at the Vasco Winds project. Lastly, the commenter recommends that compensatory mitigation be recalculated each year. The County understands that the second year of monitoring at the Vasco Winds project has been completed and that a report is expected in August 2014; however, at the time that responses to comments were prepared, the report was not yet available. Additional information from NextEra Energy Resources, the operator of the Vasco Winds project, regarding golden eagle and bat fatalities recorded during the second year, was received by the County during the public comment period and has been incorporated into the FEIR as outlined in Master Response 4.

Response to Comment FA-1-22

For a response to this comment, please see Master Response 6, *Technical Advisory Committee*.

Response to Comment FA-1-23

For a response to this comment, please see Master Response 10, *Adaptive Management*.

Response to Comment FA-1-24

For a response to this comment, please see Master Response 11, *Bat Impacts and Mitigation*.

E.3 State Agencies

SA-1—California Department of Transportation

Jul 21 2014 3:08PM HP LASERJET FAX p.1

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P.O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-6053
FAX (510) 286-5559
TTY 711
www.dot.ca.gov

Flex your power!
Be energy efficient!

July 21, 2014

ALA580854
ALA-580-0.092-8.0
SCH #2010082063

Ms. Sandra Rivera
County of Alameda
224 W. Winton Avenue, Suite 110
Hayward, CA 94544

Dear Ms. Rivera:

Altamont Pass Wind Resource Area Repowering; Golden Hills Project; Patterson Pass Project – Draft EIR

Thank you for continuing to include the California Department of Transportation (Caltrans) in the environmental review process for above named project. The following comments are based on the Draft Environmental Impact Report (DEIR) we received on June 6, 2014.

Transportation Management Plan 1
If it is determined that traffic restrictions and detours are needed on or affecting State highways, a Transportation Management Plan (TMP) or construction Traffic Impact Study may be required of the developer for approval by Caltrans prior to construction. TMPs must be prepared in accordance with California *Manual on Uniform Traffic Control Devices*. Further information is available for download at the following web address:
http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/pdf/camutcd2012/Part6.pdf.

Please ensure that such plans are also prepared in accordance with the transportation management plan requirements of the corresponding jurisdictions. For further TMP assistance, please contact the Office of Traffic Management Plans at (510) 286-4647.

Encroachment Permit 2
Please be advised that any work or traffic control that encroaches onto the State right of way (ROW) requires an encroachment permit that is issued by Caltrans. To apply, a completed encroachment permit application, environmental documentation, and five (5) sets of plans clearly indicating State

"Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability"

SA-1—California Department of Transportation

Jul 21 2014 3:08PM HP LASERJET FAX p.2

Ms. Sandra Rivera/County of Alameda
July 21, 2014
Page 2

ROW must be submitted to the address below. David Salladay, District Office Chief, Office of Permits, California Department of Transportation, District 4, P.O. Box 23660, Oakland, CA 94623-0660. Traffic-related mitigation measures should be incorporated into the construction plans prior to the encroachment permit process. See the following website for more information: http://www.dot.ca.gov/hq/traffops/developserv/permits/ 2 cont.

Please feel free to call or email Luis Meléndez of my staff at (510) 286-5606 or Luis_Melendez@dot.ca.gov with any questions regarding this letter, as for any other assistance we may provide.

Sincerely,

ERIK ALM, AICP
District Branch Chief
Local Development - Intergovernmental Review

c: State Clearinghouse

"Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability"

E.3.1 Comment Letter SA-1—California Department of Transportation

Response to Comment SA-1-1

Caltrans notes its requirements for traffic studies where construction traffic may affect state highways. No response is required in the Final PEIR.

Response to Comment SA-1-2

Caltrans notes its requirements for encroachment permits for state highways. No response is required in the Final PEIR.

E.4 Local Agencies

LA-1—East Bay Regional Park District

CONNECTING PARKS TO PEOPLE
80 YEARS
1934-2014
EAST BAY REGIONAL PARK DISTRICT

East Bay
Regional Park District

2950 PERALTA OAKS COURT • P.O. BOX 5381 • OAKLAND • CA • 94605-0381
T. 1 888 EBPARKS F. 510 569 4319 TDD. 510 633 0460 WWW.EBPARKS.ORG

July 21, 2014

Sandra Rivera
Assistant Planning Director
224 W. Winton, Room 111
Hayward, CA 94544

Sent Via E-Mail to:
Sandra.Rivera@acgov.org
July 21, 2014

RE: BRUSHY PEAK REGIONAL PRESERVE: ALTAMONT PASS WIND RESOURCE AREA REPOWERING DRAFT PROGRAM EIR (DRAFT PEIR)

Dear Ms. Rivera,

East Bay Regional Park District ("District") is responding to the Notice of Availability (NOA) for the Altamont Pass Wind Resource Area (APWRA) Draft PEIR. The District owns or manages nearly 110,000 acres of open space in Alameda and Contra Costa Counties. This includes more than 3,000 acres of parklands in Contra Costa County that have wind turbine leases. Within Alameda County, wind turbines abut the northern and eastern boundaries of Brushy Peak Regional Preserve ("Brushy Peak"). Our Master Plan also identifies a future park at Tesla located near the southeastern boundary of the proposed Program area. We previously submitted scoping comments on this project on October 4, 2010.

The Program would set the stage to nearly double the size of the existing wind resource area and extend entitlements to operate wind turbines for up to 30 years. It will result in a number of significant adverse impacts to Brushy Peak and sensitive resources in the vicinity. The Program may also impact the future park at Tesla. These include impacts to aesthetics, agriculture, biological resources, cultural resources, hazards & hazardous materials, hydrology and water quality, land use and planning and public services. We are particularly concerned that the Program takes a blanket approach to resource evaluation and does not recognize or distinguish between areas of well documented sensitive biological, cultural and aesthetic resources versus lower quality resource areas where windfarms would have more benign impacts.

We believe that the Draft PEIR is seriously flawed because its analysis is based on an improper environmental baseline and it overlooks or inadequately considers significant effects, leaving unmitigated impacts over the 30 year term of the Program. Our detailed comments pursuant CEQA are attached. Please call me at (510) 544-2627 should you have any questions regarding our letter.

Sincerely,

Chris Barton
Acting Environmental Programs Manager

Page 1 of 17

LA-1—East Bay Regional Park District

East Bay Regional Park District Comments

Altamont Pass Wind Resource Area Repowering
Draft Program Environmental Impact Report (Draft PEIR)
July 21, 2014

- Program Description, Environmental Setting & Baseline – The Draft PEIR (and Program title) frames the Program as "Repowering" which improperly leads the reader to believe the Program would merely reactivate or continue an existing use. Where, in fact, the Program is an entirely new project under CEQA without any land use entitlement ties to old windfarms. How a project is framed for evaluating impacts is important because reactivation or "Repowering" of an existing use may seem benign and inadvertently cause potentially affected parties to not review the details of the Draft PEIR and proposed Program. The Program would set the stage to nearly double the size of the existing wind resource area and extend entitlements to operate wind turbines for up to 30 years. The Draft PEIR's program description, environmental setting and baseline are misleading. This fundamentally flaws analysis throughout the Draft PEIR for the following reasons: 1
  - The program description says the project is "permitted" by County plans and zoning but then says windfarms are conditionally permitted uses (Draft PEIR, p ES-3). The Draft PEIR should be revised to clearly explain that the Program is not permitted by right and can be denied by the County under adopted General Plan and zoning regulations. 2
  - CEQA Guidelines state that the existing physical conditions in the vicinity of a project "will normally constitute the baseline physical conditions by which a Lead Agency determines whether an impact is significant"; and, EIRs should provide a realistic evaluation of the effects of a project - not overstating and not understating the impacts. The Draft PEIR's use of existing physical conditions, continued operation of old turbines, mischaracterizes impacts because "normal" circumstances clearly do not apply. Windfarm entitlements to operate expire in 2015 and 2018 with no express or implied right to continue operating (County Resolutions Z-13-36, R-2007-111). The Draft PEIR analysis assumes that in the absence of the Program, existing facilities will continue to operate indefinitely when in fact without land use entitlements, operations would foreseeably cease and reclamation plans would be implemented. 3
  - Expiration of the permit to operate and conditions requiring reclamation are unique to windfarms because of their single use utility and the ephemeral nature of alternative energy technology advancements. This is in comparison to a development where a structure can be repurposed even long after the original use is abandoned. The County's linking reclamation of old turbines to approval of future land use entitlements and CEQA clearance presents a conflict of interest and is improper.
  - The Draft PEIR Program Description should explain how the "modified boundary" was determined and is protective of well documented sensitive resources. For the program area, it appears the County used the revised boundary of the APWRA as defined by the incomplete APWRA NCCP/HCP process to expand the APWRA in Alameda County from 36,870 acres to 43,358 acres. This expansion cannot be considered to have undergone sufficient public and environmental review. It also goes against the stated goal of the East County Area Plan to maximize the production of wind generated energy 4

Page 2 of 17

LA-1—East Bay Regional Park District

"within the limits of environmental constraints" (Policy 169, p. 3.1-4.), since environmental constraints were not used to evaluate the expansion. The Draft PEIR needs to be revised to include a CEQA-level review of the consequences of the expansion of the area of the APWRA or it needs to retain the original boundary of the APWRA. Many windfarm related impacts may be avoided if they are sited away from sensitive resource areas such as Brushy Regional Preserve, the future Tesla Regional preserve, and areas surrounding these properties. Additionally, we are concerned that the County's rationale for the modified boundary is based on wind speed and zoning with no attempt to direct windfarms away from areas where they will be detrimental to sensitive resources. Would the County take the same approach and reference a few General Plan policies to justify providing programmatic CEQA coverage to allow landfills everywhere that zoning conditionally allows it? This approach to land use planning is a troubling precedent to set and should be reconsidered. 4 cont.

- The Draft PEIR should provide a chronology of changed circumstances since the County started approving windfarms in 1980. This information is essential to help us understand and evaluate the context of potential impacts over the proposed 30 year program period. The chronology should include: 5
  - Descriptions of the changes to the regulatory environment – For example, which species have been listed since 1980 & could be listed or go extinct over the term of the Program?
  - Resource protection/open space environment – What changes have occurred to protect sensitive species habitat and open space? For example, Brushy Peak Regional Preserve and other public & private open spaces and easements have come online to protect species. Windfarms should not reverse the progress toward protecting & contributing toward the recovery of species that use these lands.
  - Discovery of cultural resources – What discoveries have been made since 1980, especially those considered rare or sacred?
  - Understanding of avian and bat impact avoidance – How and why has wind turbine design improved over the years to reduce avian and bat mortality?
  - Effectiveness of laws, regulations and conditions of approval intended to protect species - Has there been any enforcement action for violations of the law?
  - Alternative energy advancements – Technology and economics could affect long term viability of windfarms. What is the outlook of windfarm technology versus other emerging alternative energy resources such as natural gas, solar, geothermal, wave, hydro, biomass, radiant.

- <u>Aesthetics</u> - Because of the intrinsic value of unobstructed views from public open spaces, any aspect of the Program that will degrade views from Brushy Peak and Tesla should be avoided. The Draft PEIR references the intent of General Plan Policy 105 to protect ridges neighboring Brushy Peak and Tesla from the visual intrusion of turbines but the proposed Program leaves the door open for development to occur. To retain the recreational experience of our users, views of ridges should be protected from open space areas, not just County Road. We believe this is consistent with the intent of Policy 105. The Program should be modified to take an affirmative position to protect ridges around these parks by outright prohibiting development at these locations. Closing this loophole in the Program will help windfarm developers plan around this sensitive resource and avoid costly public 6

Page 3 of 17

LA-1—East Bay Regional Park District

review and debate in future planning processes. The Draft PEIR should be updated to include maps showing where turbine development is prohibited for view shed protection. 6 cont.

Mitigation Measure AES-2a will increase visual impacts, not avoid or minimize them. Any mitigation measure taking a "site development review" approach should include clear performance standards that prohibit turbine or support facilities from being constructed in areas visible from public open spaces. The Draft PEIR's Aesthetics impact analysis should be reevaluated to apply a proper environmental baseline that assumes existing turbines are reclaimed. 7

The Draft PEIR does not adequately evaluate the cumulative visual impacts for build out of the Program area with windfarms. This analysis should include and address the cumulative visual effects of the three Contra Costa County repowering projects (i.e. Buena Vista, Tres Vaqueros and Vasco Winds). 8

- Agriculture – The Draft PEIR states that project proponents promise to strictly control access to its farms under the Program (Draft PEIR p. 3.8-9) to avoid and minimize death and injury of people within ½ mile of the turbines. The Draft PEIR, also, concludes that the Program will have a less than significant impact on agricultural resources. How can ranching remain viable if access is prohibited or if access is allowed there is the threat of death or injury? The Draft PEIR should address this potential impact and the Program should be designed to avoid it. 9

- Biological Resources – The Draft PEIR does not adequately analyze effects on biological resources and mitigation strategies. The District's comments pertaining to the Draft PEIR's coverage of Biological Resources are presented in **Attachment A**, the main points of which may be summarized as follows:

  - The consequence of the expansion of the APWRA program boundaries, based on an incomplete NCCP/HCP process, was not subject to sufficient environmental and public review. 10
  - Setting the current (non-repowered) annual avian fatality rates in the APWRA as the threshold of significance at which mitigation measures will be implemented is unacceptable and ignores the fact that annual avian fatality rates lower than the proposed thresholds may still likely be significant for many species, e.g. golden eagle. 11
  - The discussion of biases in avian fatality rate estimates needs to be expanded to include more than just detection probability. 12
  - The calculation of the APWRA non-repowered annual avian fatality rates are based on a report that had data problems that have since been corrected in a new report, so the non-repowered APWRA annual avian fatality rates need to be recalculated. The estimated annual avian fatality rates for the program area are based on monitoring results from two wind farms with wind turbines that are substantially smaller (e.g. 750 kW and 1 MW) than the proposed repowered turbines (e.g. 1.6 to 3 MW) and one wind farm that has comparable wind turbines (2.3 MW) but only 13

Page 4 of 17

LA-1—East Bay Regional Park District

one year of fatality monitoring, thus more variability needs to be built into the threshold analyses. 13 cont.

- Avian fatality rates are presented for the four focal species and a few others; this needs to be expanded to include the full suite of avian species affected, including passerines. 14
- The APWRA has significant, sensitive biological resources that need to be avoided when planning and siting individual projects. For example, we present evidence that Brushy Peak is a major concentration point for golden eagles in the APWRA and so should be avoided. 15
- The process of micro-siting, whereby wind turbine siting plans are compared to avian risk maps, needs to be more open to outside review during both the preconstruction planning and post-construction verification phases. 16
- The Avian Protection Plans, both programmatic and project specific, need to be provided for proper review. 17
- Additional mammal species need to be covered by the EIR, and the bat fatality rates 18
  need to be calculated on a per MW-year basis. 19

- Cultural Resources - The northern portion of the Brushy Peak is closed to public access and there is ongoing monitoring and police enforcement to protect sensitive cultural artifacts in the area. It is very likely that similar or higher valued sacred cultural artifacts occur on adjacent properties where the Program will allow turbines, related facilities and maintenance workers. The Draft PEIR recognizes high value cultural resources in and around Brushy Peak but is inadequate because it does not acknowledge or respect the rareness of these resources in its impact analysis or mitigation measures. If people are not allowed in sacred areas of Brushy Peak, why does the Program propose to open the door to construct ~400+' tall turbines, access roads and ongoing maintenance in adjacent areas with similar Native American cultural value? 20

  Program level analysis and mitigation measures should steer impacts away from highly constrained area, not lump areas together as if they are of equal value with no consideration of known differences in resource value. We do not believe that Mitigation Measure CUL-1a: Avoid historic resource, will reduce these impacts to "Less than Significant". Siting repowered wind turbines under program Alternative 1: 417 MW and program Alternative 2: 450 MW in close proximity to Brushy Peak Archaeological District will result in Impact CUL-1a-1 and Cul-1a-2, e.g., cause a substantial adverse change in the significance of a historical resource, especially to Native Americans.

  In addition, in reference to p. 3.5-6: Land ownership attributed to Brushy Peak Archaeological District (Resource Number P-01011111 and P-01-011114; Table 3.5-1). The Program should be modified or mitigation measures adopted to prohibit windfarm activities at properties surrounding Brushy peak. The Draft PEIR mentions that Brushy Peak Archaeological District is adjacent to the program area and assigns it to properties owned by the EBRPD. However, the Draft PEIR fails to include portions of P-01011111 and P-01-011114 that occur on land owned and managed by the Livermore Area Recreation and Park District. This should be corrected.

LA-1—East Bay Regional Park District

- Hazards and Hazardous Materials – The Draft PEIR does not provide sufficient information or analysis on how hikers, bicyclists, equestrians or ranch operators may be impacted by "blade throw". It suggests that this phenomena may cause death or injury to anyone within ½ mile of a turbine but qualifies that the County's buffer guidelines are not based on conclusive data (Draft PEIR p. 3.8-26). The analysis should take into consideration that trespass is a common existing condition in open space areas adjacent residential areas and that ranchers and utility workers may come within ½ mile of a turbine. The Draft PEIR analysis is flawed because it relies on describing relative risk compared to existing turbines rather than the actual risk of the turbines being proposed. Even using the flawed environmental baseline as a point of analysis, there is no evidence to support the Draft PEIR's conclusion that this impact is less than significant. The Draft PEIR should work out a proper assessment of risk from "blade throw" and buffers to safely allow regional trail connections identified by our Master Plan – "Brushy Peak to Del Valle", "San Joaquin County to Shadow Cliffs", "Brushy Peak to Bethany Reservoir" and "Vasco Caves to Brushy Peak." 21

  The Draft PEIR evaluation of wild land fire and hazardous materials spill risk is inadequate because the environmental baseline assumes existing turbines will remain in operation. The Draft PEIR should analyze wildfire and hazardous material spill potential from the new turbines and develop mitigation measures to avoid and minimize this potential impact. One would assume that due to the extreme size difference between new versus old turbines that additional hazardous material transport and storage (lubricants in gearboxes?) would be needed. The Draft PEIR should answer this question so we can better understand and evaluate the spill hazard. 22

  The Draft PEIR does not adequately analyze how the height of turbines and expansion of the Program area may pose a hazard to aerial firefighting. Helicopters and planes are commonly used to control wildfire on open grasslands in the Program area. The Draft PEIR should analyze if the new turbines will pose a risk to firefighting personnel and impair their ability to fight wildfires (and increase the risk to life and property) if aircraft cannot be used to fight fires due to hazards posed by turbines. 23

- Hydrology and Water Quality – As required by previous use permit conditions, operators of old windfarms should remove unneeded roads and associated drainage facilities. Some of the roads are in poor condition; some are highly erosive, causing substantial downslope sedimentation in wetlands and riparian areas, impacting the species that depend upon these habitats, including tiger salamander, red-legged frog and fairy shrimp. Abandoned roads should be recontoured and restored with native perennial grasses. The restoration will need maintenance and monitoring for several years until successfully established. The operators should be required to create an endowment, a management and monitoring plan, establish specific restoration objectives, conduct proposed improvements, and provided for long-term maintenance and monitoring of reclaimed road areas. 24

  New access roads should be designed to minimize the potential for slope failure and erosion. Drainage should be contained and discharged in a manner that does not concentrate flows that scour hillsides or deposit sediments and other pollutants into wetlands and drainages. A portion of the project area drains into the Preserve. To prevent

Page 6 of 17

LA-1—East Bay Regional Park District

new roads from falling into degraded conditions, a mitigation measure should be adopted for the County to evaluate erosion and sedimentation along roadways and drainages as part of routine inspection of windfarm areas. Operators should provide financial assurances so repairs can be made in a timely manner. 24 cont.

- Land Use and Planning – The Draft PEIR does not adequately analyze or address the Project's apparent conflict with Federal and State regulations adopted for the purpose of avoiding or mitigating environmental effects to migratory birds (Migratory Bird Treaty Act) and Golden and Bald Eagles (Bald and Golden Eagle Protection Act). The Draft PEIR is flawed because it assumes that reduce death compared to existing conditions is acceptable where under the law "no take" is the standard. The Draft PEIR should provide sufficient analysis and meaningful discussion to inform the public debate on the following key issues: 25
    - What is the legal framework that allows a public agency to approve land use entitlements for projects that violate these regulations?
    - Disclose efforts, if any, to invoke criminal penalties for violation of the regulations.

The proposed Program conflicts with County General Plan Policy 133 (County shall require that the impacts of wind turbine operations on bird populations are minimized) because it ignores well known data that Brushy Peak and ridges surrounding Brushy peak are a magnet for Golden Eagles. To avoid misguiding future windfarm proposals, the Program should be modified to affirmatively steer development away from highly constrained areas like these. To effectively implement General Plan Policy 133, the County should consider amending its General Plan land use map and Zoning designation to not allow windfarms in sensitive areas like these. 26

The Draft PEIR overlooks the Program's potential land use conflict with the District's Master Planned Trails (Draft PEIR p. 3.14-2) - Brushy Peak to Del Vale, San Joaquin to Shadow Cliffs, Brushy Peak to Bethany Reservoir, Vasco Caves to Brushy Peak. Analysis in the Hazards section of the Draft PEIR suggest that trails going through the Program area will need buffers from turbines. Mitigation measures should be adopted to ensure that trail alignments are accounted for in the placement of turbines and adequate safety buffers are maintained. 27

- Public Services – Windfarms and their support facilities are targets for theft and vandalism which require an increased level of police work versus historic ranch use. This is a potentially significant impact that should be addressed in the Draft PEIR. Under current conditions, existing windfarms would be reclaimed and presumably brought back to dedicated ranching operations. The project would double the life of windfarm operations and nearly double the size of the program area. This should be accounted for in evaluating how the project will impact police services. 28

The height of new turbines could foreseeably change the way local and State firefighting crews respond to wildfires since aircraft may not be safely deployed. The Draft PEIR should evaluate if this will impact firefighting resources. Also related to aircraft and the height of the turbines, the Draft PEIR should address if emergency response times will be reduced if 29

Page 7 of 17

LA-1—East Bay Regional Park District

medevac helicopters cannot be utilized for emergency situations (e.g. worker injury, "blade throw" incidents). 29 cont.

- Alternatives Analysis – The Alternatives analysis is flawed because it assumes the environmental baseline is that existing turbines will continue to operate even though use permits clearly state that there is no express or implied right to continue operating past defined expiration dates. This not only makes the "No Pr oject" analysis meaningless but also carries over to flaw every alternative considered in the Draft PEIR. The Draft PEIR's "No Repowering, Full Decommissioning" is the proper environmental baseline and "No Project" alternative from which impacts should be measured. 30

  The Draft PEIR should include an alternative that excludes locations of high raptor use, visibility from public open spaces and have a high potential for the presence of sacred cultural resources (such as Brushy Peak and vicinity) from the Program area. The alternative should also include implementing General Plan Policy 133 by amending the County's General Plan land use map and zoning designations to not allow windfarms in sensitive areas. 31

- Other – Technological advancements and market forces could foreseeably make windfarms obsolete before the end of the 30 year Program. Derelict windfarms are a blight to the community and present significant health & safety risks to the public, an ongoing code enforcement problem and severe water quality, erosion and sedimentation issues. These potential impacts are not identified or addressed in the Draft PEIR. Mitigation measures should be developed that would require windfarm operators to develop a reclamation plan for review and approval by the County and submittal of financial assurances to cover the cost to implement the approved reclamation plan prior to the issuance of a grading permit. 32

- References – See Attachment A.

Page 8 of 17

LA-1—East Bay Regional Park District

Attachment A

East Bay Regional Park District Comments
July 21, 2014

Altamont Pass Wind Resource Area Repowering
Draft Program Environmental Impact Report (Draft PEIR)

Chapter 3 Impact Analysis
3.4 Biological Resources

p. 3.4-2. Migratory Bird Treaty Act - Take of migratory birds. Should state that the Migratory Bird Treaty Act cannot authorize the take of migratory birds by the program and projects covered in the Draft PEIR. 33

p. 3.4-2 The Bald and Golden Eagle Protection Act - Take of golden and bald eagles. A programmatic eagle take permit was issued by the USF&WS on June 26, 2014. (http://www.fws.gov/cno/conservation/migratorybirds.html). The entities repowering the APWRA should seek an eagle take permit to adequately address mitigation and compensation for the unavoidable take of eagles during the life of the CUP, e.g. through a FONSI: http://www.fws.gov/cno/conservation/MigratoryBirds/ShiloIV-FONSI/ShilohIV-EaglePermit-FONSI-June2014.pdf. 34

p. 3.4-4. Take of fully protected species. Should state that CDFW cannot issue take permits under sections 3511, 3513, and 4700 of the Fish & Game Code for the unavoidable take of migratory birds and bats by the program and projects covered in the Draft PEIR. 35

p. 3.4-5. Protection of birds and raptors. The Draft PEIR should state that CDFW cannot issue take permits under section 3503 of the Fish & Game Code for the unavoidable take of birds and raptors by the program and projects covered in the Draft PEIR. 36

p. 3.4-6. East Alameda County Conservation Strategy (EACCS). Although wind energy projects are covered under the EACCS, the programmatic BO for the EACCS does not cover avian and bat effects caused by wind energy projects and cannot provide incidental take authorization. Therefore, the EACCS does not offer mitigation strategies for the unavoidable take of migratory birds and bats. 37

p.3.4-7. 2007 Settlement Agreement. 38

- The Draft PEIR states "As an alternative to the NCCP called for in the Settlement Agreement, the County has developed a draft *Avian Protection Program* (APP) to provide a framework and process for wind energy projects to comply with applicable statutes (e.g., MBTA and BGEPA) through the repowering process." This statement is misleading because repowered wind projects cannot comply with the MBTA due to unavoidable take of migratory birds.
- The Draft PEIR also states "The key provisions of the APP have been incorporated into this PEIR as impacts and mitigation measures." It would be useful if the County could

Page 9 of 17

LA-1—East Bay Regional Park District

provide copies of the draft APP and list it in the references to enable comparison with the PEIR. 38 cont.

p. 3.4-20. Special Status Species. Should retitle this section to include non-special status species such as red-tailed hawk, prairie falcon, etc. 39

p. 3.4-21. Large flowered Fiddleneck. Should update this account with the latest occurrence data from Lawrence Livermore National Lab rare plant reports. 40

p. 3.4-25. Longhorn Fairy Shrimp. Rock-based vernal pools located in sandstone outcrops represent potential habitat for this species. The Draft PEIR should state whether this habitat occurs in the Golden Hills or Patterson Pass Wind project areas. It certainly occurs throughout the program area. 41

p. 3.4-43. Mammals. The Draft PEIR does not address the San Joaquin Pocket Mouse (*Perognathus inornatus inornatus*) and San Francisco Dusky-footed woodrat (*Neotoma fuscipes annectans*), both California Dept. Fish & Wildlife Species of Special Concern (California Department of Fish and Wildlife 2011), which occur in the APWRA. It also does not address the San Joaquin Kangaroo Rat (*Didpidomys heermanni tularensis*). Kangaroo rats are key prey species of the San Joaquin kit fox. All of these species need to be covered in the Draft PEIR. 42

p. 3.4-35. Swainson's hawk. There is at least one new record of Swainson's hawk nesting in the program area (EBRPD data). 43

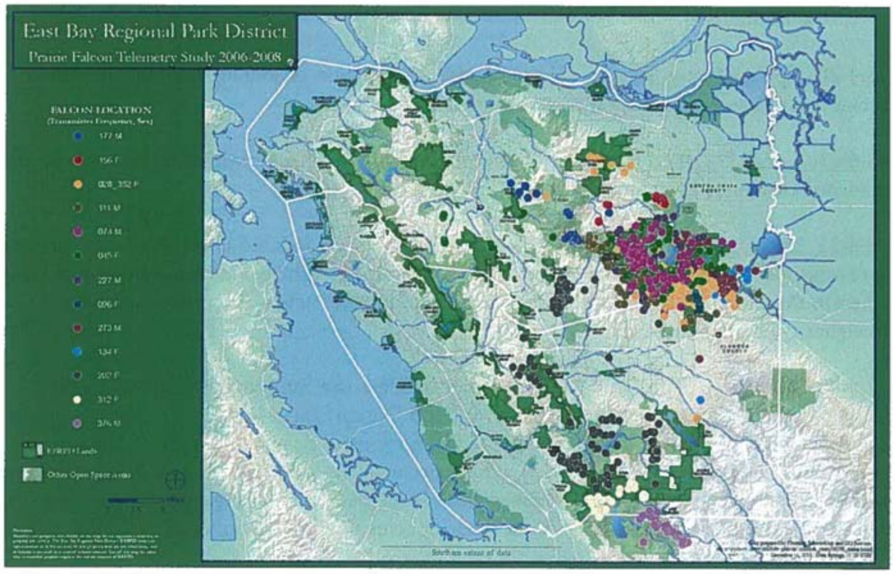
p. 3.4-35. Red-tailed hawk. The Draft PEIR states that "this species is primarily a sit-and wait predator…". Flight behavior of the red-tailed hawk and other species in the APWRA has been well documented and should be expanded upon for the purpose of assessing impacts. For instance, red-tailed hawks engage in hovering and kiting flight behavior that places them at high risk of turbine blade strikes (Smallwood et al. 2008). 44

p. 3.4-36 Golden Eagle. Draft PEIR should note that prey of the golden eagle includes small mammals such as California ground squirrel. Draft PEIR should also note that there are at least three historic and one recent record of golden eagle nests within the APWRA (EBRPD, unpubl. data). In addition, suitable nesting habitat may be present in the Golden Hills and Patterson Pass project areas if these project sites have at least one or more eucalyptus trees present. 45

p. 3.4-37. Prairie falcon. Draft PEIR mislabels this species as a "APWRA focal species". Suggest relabeling as "a species of local conservation concern in the APWRA". There are at least four recent, known nest sites located within the (two county) APWRA and at least two more nest sites located within 2 miles of the program area (EBRPD data). In addition, radiotelemery data on prairie falcons indicates extensive use of the APRWA by falcons nesting more than ten miles from the program area (EBRPD unpublished data, see Figure 1 below). 46

Page 10 of 17

LA-1—East Bay Regional Park District



46 cont.

Figure 1. Prairie falcon radiotelemetry locations, 2006-2008. Locations for individual prairie falcons indicated by different colors (N = 13 falcons). Note extensive overlap and use of the northern APWRA by up to six different falcons. Falcons nesting up to 10 miles away from the APWRA still use it.

<u>p. 3.4-45. Avian Mortality and Monitoring</u>. 47

- Should expand discussion to include all species of birds (other raptors and non-raptors) that are taken by wind farm operations in the APWRA. Nearly all EIRs, gray reports and the scientific papers produced on mortality rates in the APWRA have addressed the entire suite of avian and bat species affected by wind operations, e.g. see Smallwood 2007, 2013a, Smallwood and Thelander, 2004, Smallwood and Karas 2008, Smallwood et al. 2008, Smallwood et al. 2010).
- We agree that the most effective way to reduce avian mortality, aside from Alternative 4.2.2 No Repowering, Full Decommissioning (p. 4-23); is to repower the APWRA, however, repowering is fraught with many unknowns. Larger, fewer wind turbines may not be a blanket panacea. For example, Loss et al (2013) found increasing avian mortality with increasing turbine hub height in a comparison of wind facilities across the United States. The Draft PEIR presents evidence that fatalities have been reduced at three repowered projects in the APWRA, Diablo Winds, Buena Vista and Vasco Winds. For the latter, information is presented from the first year of fatality monitoring of the 2.3 MW turbines (the second year avian and bat fatality monitoring report is not yet available for review). This comparison, while based on the most recent available science (Brown et al. 2013), is decidedly premature and should be noted as such. Ultimately, repowering of the APWRA needs to be done with the best available science and rigorous independent review of the wind turbine siting plans. We cannot afford to 48

LA-1—East Bay Regional Park District

repeat the same environmental mistakes over the next 30 years that were made over the previous 30 years. 48 cont.

p. 3.4-46 Bat Fatality and Monitoring. We are truly in the dark regarding bat fatality estimates and assessing impacts to bat populations from wind operations in the APWRA. But the Draft PEIR should present, in addition to raw bat fatalities in Table 3.4-6, adjusted mortality rates based, as per Smallwood and Karas (2008) or Smallwood (2013), for example, to allow comparison with studies on bat mortality rates elsewhere. 49

p. 3.4-51 to 54. Avian Fatality Rate Analysis Methods.

- Draft PEIR state should reference reports that provide estimates based on number of birds killed per turbine per year. 50
- Draft PEIR states that "a larger number of 1 MW turbines than 2.3 MW turbines cannot be installed in a given space…a given project…might support a roughly equivalent number of 1 MW or 2.3 MW turbines". This statement is inaccurate. The Buena Vista project has 1 MW turbines installed in tight strings along ridge lines in a density that could not be achieved with 2.3 MW turbines, e.g. compare with Vasco Winds 2.3 MW turbines. 51
- The Draft PEIR relies on fatality rates in its analysis calculated from the 2005-2011 bird years as presented by the Alameda County Avian Fatality Monitoring Program and compiled in the ICF International (2013) report. The latter was subject to numerous technical difficulties including data control Leslie (2013) and study design (Smallwood 2013b). New annual fatality rates should be calculated using the revised data base as per ICF International (2014). 52
- As noted above, Draft PEIR uses fatality data from three repowered wind projects in the APWRA, Diablo Winds, Buena Vista and Vasco Winds, to estimate fatalities expected from the repowering program and from the covered repowering projects. The Draft PEIR does not present adequate discussion of the study design and methods underlying the monitoring studies from the three repowering projects, so the reader is unable to formulate an informed opinion about the veracity of the projected avian fatality estimates. Fatality estimates derived from the Vasco Winds project are based on a single year of monitoring which is problematic given the extreme year-to-year variability in fatality rates (Smallwood 2013b). 53
- The Discussion of potential biases in the avian fatality analysis methods is incomplete. The Draft PERI should address searcher interval, scavenger and crippling biases (e.g. Smallwood 2007, 2013a). 54

p. 3.4-53, Table 3.4-10. Table presents projected fatality rates of non-repowered and repowered turbines. 95% confidence intervals are not included, annual adjusted fatality rates should be estimated out to 3 decimal places, as per most other reports (e.g. ICF international 2014). Fatality rates for entire suite of affected avian species should be presented. 55

p. 3.4-54. Bat Fatality Analysis Methods. See comments under p. 3.4-46

p. 3.4-55. Determination of Significance. The Draft PEIR sets the level of significance for avian mortality by comparing the *projected* fatality rate to the *baseline* (nonrepowered) fatality rate 56

Page 12 of 17

LA-1—East Bay Regional Park District

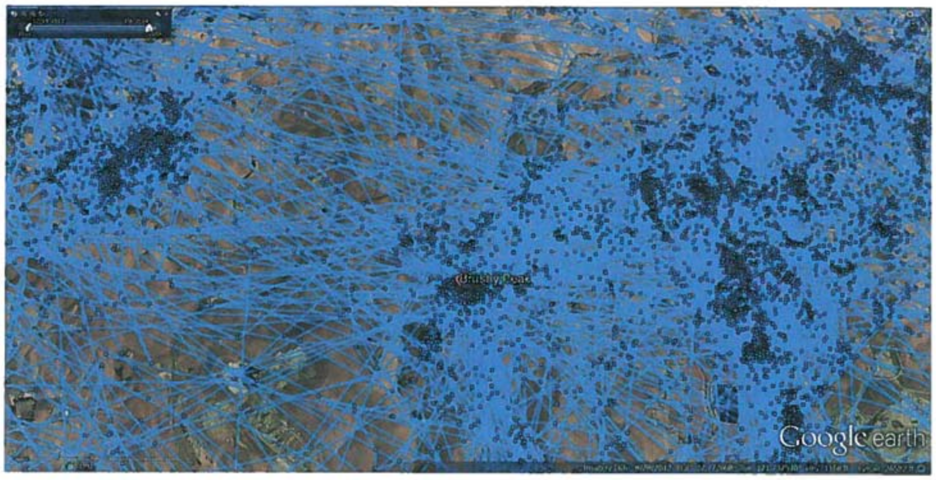
derived from existing conditions. The Draft PEIR states "Where the projected rate would exceed the baseline rate, the impact would be significant; if the projected rate is below the baseline rate, the impact would be considered less than significant." We contend that setting the existing APWRA (nonrepowered) fatality rates as the determinant of significant effects is erroneous, because 1) fatality rates far below the current APWRA fatality rates may still represent a significant impact to a given species and 2) the current APWRA fatality rates are out of compliance with the conditions of the 2007 and 2010 Settlement Agreements (ICF International 2014) . The baseline condition for measuring significant impacts and triggering adaptive management should be reconsidered after consultation with the APWRA SRC and others. It may be that the baseline condition that pertains to the "No Repowering, Full Decommissioning" alternative is the proper starting point for this CEQA analysis. The Draft PEIR should acknowledge that post-repowering fatality rates, even if they are lower than the "baseline" nonrepowered levels listed in Table 3.4-11, may still have a significant impact on a given species, and that adaptive management may require additional mitigation in response to new information on effects on local populations, e.g. golden eagles. 56 cont.

p. 3.4-98 to 112. Impact Bio-11a-1.

- p. 3.4-99. Table 3.4-11. We believe the average annual fatalities presented in this table are based on data that required vetting (Leslie 2013), and thus, new baseline fatality estimates should be calculated. For example, whereas the Table 3.4-11 estimates a baseline annual fatality rate for golden eagle at 26.6 individuals, ICF International (2014) presents 3-year rolling average fatality rates of golden eagles at 32 to57 individuals for 2005-2012. 57
- P. 3.4-101. Golden Eagle. The Draft EIR summarizes the work of Hunt (2002) and Hunt and Hunt (2006) on golden eagle fatality rates and local population stability, highlighting that the AWPRA represents a population sink for the estimated 60-70 active territories within 30 km of the APWRA (see also Bell and Smallwood 2010). Hunt and Hunt (2006) estimate that the reproductive output of 167 pairs of golden eagles would be required to compensate for the APWRA fatality rate and sustain the local population. Efforts are underway to ascertain the actual size of the local golden eagle population (USGS 2013), but it is likely that immigration of golden eagles into the APWRA from elsewhere is sustaining the local population. 58
- One area that is heavily used by golden eagles in the APWRA is Brushy Peak. The peak and its vicinity are currently devoid of wind turbines. The EBRPD has been tracking golden eagles using GPS/GSM transmitters and current data show that Brushy Peak is a major concentration location for golden eagles (see Figure 2, below) and may represent a communal roost location. Future repowering plans should avoid placing turbines within established buffers around Brushy Peak to provide a turbine-free environment for eagles using Brushy Peak and lower the risk of golden eagle/wind turbine blade strikes. 59

Page 13 of 17

LA-1—East Bay Regional Park District



59 cont.

Figure 2. Map of Brushy Peak, northern APWRA, with golden eagle satellite tracking locations superimposed. Brushy Peak is located in the center of the map. Golden eagle locations points (dark circles) with interconnecting tracks (blue). Tracks represent the shortest distance between two location points. Based on tracking information from up to 12 golden eagles between December 2012 and March 2014. Note high concentration of eagle locations centered at Brushy Peak. Scale bar lower left = approx. 6000'.

<u>p. 3.4-102. Prairie Falcon</u>. 60

- The APWRA annual estimated fatality rate for this species for the bird years 2005-2007 ranged from 0 to 22 fatalities/MW/yr, with an average of 7 fatalities/MW/yr (ICF International 2014). Thus, impact of the APWRA on the local breeding population, which ranges from 5-9 pairs, could be severe.
- Prairie falcon use of the AWPRA is higher than indicated by BBS (see above comments under p. 3.4-37).
- Draft EIR states that given this species foraging flight characteristic, it would be "...difficult to hypothesize how repowered turbines may affect the risk of turbine collision." Smallwood et al. (2008) reported prairie falcons engaging in kiting and hovering flights (especially risky behaviors for blade strikes) represented 30% of all observed flights.

<u>p. 3.4-104. Mitigation Measure BIO-11a. Prepare a site-specific avian protection plan.</u> Both the program level and project specific avian protection plans should be spelled out in the Draft PEIR. Our concern is that the current APWRA program of on-call personnel who respond to reports of injured or dead raptors and other birds, record such incidents for reporting to regulatory agencies, and transport animals to rehab centers, will be curtailed. This program is vital to assessing overall impacts of wind operations. 61

<u>p. 3.4-104. Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds</u>. 62
We applaud the efforts to use best available science to site repowered turbines to reduce

LA-1—East Bay Regional Park District

collision risk, as per Smallwood et al. (2009). However, micro-siting analyses for individual wind projects need to be open and available for review by independent scientists. Recent repowering projects in the APWRA have not been open to pre-construction and post-construction independent review of the turbine micro-siting plans. Extensive public monies have been invested in the risk mapping efforts for the APWRA, thus, the micro-siting process should be open to peer review in both the pre- and post construction phases of a project. There is precedent for need of oversight of wind company compliance with mitigation plans (Smallwood 2008). 62 cont.

p. 3.4-106. Mitigation Measure BIO-11g: Implement post-construction avian fatality monitoring for all repowering projects.

- Post-construction monitoring should begin with start of the commercial operation date (COD), not within 3 months of the COD as listed in the Draft PEIR. Impacts from wind operations begin immediately. Further, start-up of wind farm operations may have greater impacts in the initial phases then later operations and thus should be measured. 63
- The additional monitoring program implemented at year 10 should be three years in duration, not 2 years as listed in the Draft PEIR. This will allow direct comparison with the initial 3 year monitoring program begun at COD, account for inter-year variation in bird use and fatality rates in the APWRA (Smallwood 2013b), and allow for more accurate trend analysis.
- County should consider continuing the Scientific Review Committee (SRC) rather than establishing a TAC. Make-up of the TAC should include qualified scientists, including biostatisticians. 64
- The Draft PEIR should discuss the creation and sun-setting of the APWRA Scientific Review Committee in relation to the 2007 Settlement Agreement, and how the role of the new TAC will compare to the function of the SRC.

p. 3.4-106 to 110. Mitigation Measure BIO-11h: Compensate for the loss of raptors, including golden eagles, by contributing to conservation efforts. 65

- The Draft PEIR should include a discussion of non-raptors and possible mitigation strategies. Compensation strategies should consider cumulative impacts of loss of individuals, e.g. loss of reproductive potential, especially for long-lived birds such as golden eagles. 66
- Contribute to raptor recovery efforts. Draft PEIR should consult with other rehab centers to establish a range of costs for raptor rehabilitation, such as The Lindsay Wildlife Hospital in Walnut Creek and Sulphur Creek Nature Center in Hayward, as those facilities receive the majority of birds wounded in the Altamont. Cost should reflect rehab costs of wind farm injured birds, which often require a higher level of care and surgery if they are not euthanized right away due to irreparable injuries. 67
- Contribute to raptor conservation efforts. The $580/raptor listed in the Draft PEIR should be adjusted after consultation with several rehab centers.
- Contribute to regional conservation of raptor habitat. Additional options for conservation could include: purchasing mitigation credits for golden eagles and other species via conservation banks, similar to those credits that are now applied for threatened and endangered species mitigation (assuming these will be approved by regulatory agencies); credit for retirement of wind farms that are particularly deadly to 68

Page 15 of 17

LA-1—East Bay Regional Park District

wildlife or located in very high risk zones (rather than repowering); payment to ranchers to curtail ground squirrel control programs and compensate them for economic losses; support of hunter-education programs to cease use of lead ammunition; supplying hunter groups with new forms of ammunition at event gatherings, e.g., "squirrel round-ups or shoots" that are now popular throughout the west and that produce copious ground squirrel carcasses with lead fragments that that are subsequently consumed by scavenging eagles. 68 cont.

p. 3.4-110. Mitigation Measure BIO-11i: Implement an avian adaptive management program. The Draft PEIR should not use the non-repowered fatality estimates as the trigger for implementing adaptive management measures, as the APWRA existing fatality rates are already represent a significant and unacceptable level of impact. Threshold levels would need to be revised accordingly. 69

- Thresholds. Draft PEIR implies that thresholds would pertain to only groups of species, i.e., all focal species, all raptors, all non-raptors, all birds. Threshold should be broadened to include individual raptors species and other birds so that if a future unanticipated problem arises with impacts to, for instance, horned larks, mitigation strategies can be implemented. 70
- ADMM-1: Visual Modifications. Painting blades is an unproven mitigation measure. Testing the effect of painting would require huge resource input that would be better spent on other mitigation measures, such as ADMM-4: Turbine curtailment. 71
- ADMM-4 Turbine Curtailment. This would be the most effective mitigation measure, and should be implemented sooner than at threshold 3 in the case of golden eagles. 72
- ADMM-6 Real Time Turbine Curtailment. This measure may be hard to implement in the APWRA, given the frequency and level of raptor use in the area. 73

p. 3.4-111. ADMM-3: Contribution to Research. Draft PEIR should explain how it arrived at the proposed mitigation payment of $2,000 for each golden eagle fatality exceeding thresholds to support research and explain whether this fee would be adequate for cumulative impacts to golden eagles. 74

p. 3.4-112 to 121. Impact BIO-11a-2 through Mitigation Measure BIO-11i. The comments above apply to the Impacts and Mitigation Measures listed for the programs and projects in this Chapter 3.

References

Bell, D. A. and K.S. Smallwood. 2010. Birds of prey remain at risk. Science 330: 913.

California Department of Fish and Wildlife 2011. Special Animals (898 Taxa), January 2011. California Department of Fish and Wildlife. http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spanimals.pdf.

ICF International. 2013. Draft Altamont Pass Wind Resource Area Bird Fatality Study, Bird Years 2005-2011. SRC M96.

LA-1—East Bay Regional Park District

ICF International. 2014. Draft Altamont Pass Wind Resource Area Bird Fatality Study, Bird Years 2005-2012. SRC Ref No. M101. http://www.altamontsrc.org/alt_doc/m101_apwra_2005_2012_bird_fatality_report.pdf

Leslie, D. 2013. Results of the now complete data "scrub". Memorandum, ICF, SRC Ref No. M98. http://www.altamontsrc.org/alt_doc/m98_database_rectification_completion_memo.pdf

Loss, S.R., Will, T. and P. P. Marra. 2013. Estimates of bird collision mortality at wind facilities in the contiguous United States. Biological Conservation 168:201-209.

Smallwood, K.S. 2013a.Comparing bird and bat fatality-rate estimates among North American wind-energy projects. Wildlife Society Bulletin 37:19-33.

Smallwood, K.S. 2013b. Long-term trends in fatality rates of birds and bats in the Altamont Pass Wind Resource Area, California. SRC Ref No. R68. http://www.altamontsrc.org/alt_doc/r68_smallwood_altamont_fatality_rates_longterm.pdf

Smallwood, S. 2012. Status of avian utilization data collected in the Altamont Pass Wind Resource Area, 2005-2011. SRC Ref. No. P231.

Smallwood, K.S. 2008. Wind power company compliance with mitigation plans in the Altamont Pass Wind Resource Area. Environmental & energy law policy journal 2:229-285.

Smallwood, K .S. 2007. Estimating wind turbine-caused bird mortality. Journal of Wildlife Management 71:2781-2791.

Smallwood, K. S., and B. Karas. 2008. Avian and bat fatality rates at old-generation and repowered wind turbines in California. Journal of Wildlife Management 73:1062-1071.

Smallwood, K. S., and C. G. Thelander. 2008. Bird Mortality in the Altamont Pass Wind Resource Area, California. Journal of Wildlife Management 72:215-223.

Smallwood, K.S., Bell, D.A., Snyder, S.A. and J. E. DiDonato. 2010. Novel scavenger removal trials increase wind turbine-caused avian fatality estimates. J. Wildlife Management 74:1089-1097.

Smallwood, K.S., Neher, L. and D. A. Bell. 2009. Map-based repowering and reorganization of a wind resource area to minimize burrowing owl and other bird fatalities. Energies 2:915-943; doi:10.3390/en20440091 5, www.mdpi.com/journal/energies.

USGS 2013. Golden Eagle Information Brief. Forest and Rangeland Ecosystem Science Center, USGS. August 2013.

E.4.1 Comment Letter LA-1—East Bay Regional Park District

General Response to Letter LA-1

EBRPD summarizes its land management responsibilities and its comments on the program approach. In addition, EBRPD summarizes its comments on the Draft PEIR, which are expressed in more detail in its other comments. Please see the responses to the remaining comments from EBRPD below for responses to these comments.

Response to Comment LA-1-1

The commenter states its opinion that the use of the term *repowering* is misleading. The term *repowering* has been used in the APWRA and in Alameda County for many years to mean the removal and replacement of turbines, and that is the meaning of the term in this document. For example, in the 1998 *Draft Repowering Program EIR*, the County defined repowering as follows:

> "Repowering" refers to the replacement of existing, less efficient turbines with a smaller number of new, larger and more efficient turbines. It is intended that the Repowering Program serve to guide the removal of aging wind turbines and their replacement with the latest generation of advanced technology turbines.

Response to Comment LA-1-2

The commenter states that the program description is unclear in its description of the zoning and general plan regulation of windfarms, that the program description states that the proposed uses are "permitted" by County plans and zoning but then says windfarms are conditionally permitted uses (Draft PEIR, p. ES-3), and that the Draft PEIR should be revised to clearly explain that the Program is not permitted by right and can be denied by the County under adopted General Plan and zoning regulations.

It should be noted that windfarm uses are explicitly allowed by Policy 169 in the East County Area Plan, subject to meeting other related policies (Policies 168 through 175). The "Program," as the *framework* within which the repowering will be considered, cannot itself be 'denied', although individual Conditional Use Permits, if approved as assumed and intended by the County in its East County Area Plan (part of the County General Plan), are subject to specific conditions for discretionary planning approvals as provided for under state law, as well as the requirement to make specific findings.

The first paragraph of Section ES.1.5, *Program Description*, on page ES-3 of the Draft PEIR has been revised as shown below.

> The program is the anticipated approval by the County of new CUPs to allow new windfarm uses in the APWRA, as permitted by ~~both~~ the *East County Area Plan* (ECAP) and <u>conditionally permitted in</u> the County Zoning Ordinance. Windfarm uses are conditionally permitted in the "A" (Agriculture) zone district, which encompasses the entire program area, and in areas designated under the ECAP as Large Parcel Agriculture (LPA), which applies to almost all of the program area. As a program EIR, this document analyzes a series of actions that are related geographically and that are likely to have similar environmental effects that can be mitigated in similar ways (see State CEQA Guidelines Section 15168[a]). The series of actions—anticipated approvals of a series of CUPs—will result in progressive repowering of the APWRA: decommissioning of existing old-generation turbines, installation of new turbines, and operation for the expected life of the new turbines under a 30-year permit and conditions of approval that include implementation of the identified mitigation measures.

When approving new CUPs for repowering, the County intends to facilitate such repowering projects through reliance on the mitigation measures contained in this PEIR as uniform standards where appropriate and by tiering from this PEIR to provide a framework for an area-wide analysis.

Response to Comment LA-1-3

Please see Master Response 1, *Baseline and Determination of Significance*, regarding the identification of the baseline for the analysis in the PEIR. The baseline for assessing the impacts of the proposed program and projects is the existing conditions, which include operating wind turbines. The PEIR evaluates a future scenario—the No Repowering, Full Decommissioning alternative under which all turbines would be decommissioned and no new turbines would be constructed—in Chapter 4, *Alternatives Analysis*, of the Draft PEIR.

The commenter expresses the opinion that windfarms are an "ephemeral" use. Infrastructure to support wind energy generation, including roads, transmission lines, and substations is established can continue to support wind energy generation with successive generations of wind turbine technologies.

The commenter's statement that the County has linked "reclamation of old turbines to approval of future land use entitlements and CEQA clearance" is not correct. Reclamation of old turbines is required as a condition of approval of the CUPs authorizing operation of the old turbines. The PEIR describes the impacts of decommissioning of existing turbines in response to scoping comments. In addition, decommissioning of proposed turbines is analyzed in the PEIR, as these actions would be part of the implementation of the CUPs for new turbines.

Response to Comment LA-1-4

Please see Master Response 2, *Program Area Boundary*, regarding the program area boundary. The PEIR does present a program-level environmental analysis of the County approving permits for wind energy projects within the expanded boundary. When specific projects are proposed, the environmental review will be carried out at a project-specific level, and the impacts of specific turbine locations will be analyzed at that time.

Response to Comment LA-1-5

The Draft PEIR presents a description of existing conditions. Please see Master Response 1, *Baseline and Determination of Significance*, for more discussion of existing conditions and baseline. To the extent that changes in the environment took place after 1980, those changes would be reflected in the actual existing physical conditions in the program area.

Response to Comment LA-1-6

The commenter suggests that the County should identify areas where turbine development is prohibited for viewshed protection, specifically in the areas of Brushy Peak Regional Preserve and the proposed Tesla Park. At this time, as described in the Draft PEIR, no turbines are proposed to be sited in the areas described in this comment as being of concern. The County has not undertaken studies that would support its identifying specific areas where turbine development should be prohibited. However, as described in detail in Section 1.1.2, *Program-Level Analysis and Tiering*, on page 1-1 of the Draft PEIR, specific projects proposed in the future would undergo project-level environmental analysis tiered from the PEIR.

Response to Comment LA-1-7

The commenter states that Mitigation Measure AES-2a will result in additional environmental impacts and that it does not contain performance standards. The text of Mitigation Measure AES-2a may be confusing; accordingly, the text of the mitigation measure on page 3.1-16 of the Draft PEIR has been revised as shown below. New-generation turbines may not be developed in strings.

> **Mitigation Measure AES-2a: Require site development review**
>
> ~~Do not allow n~~New turbines along ridgelines or hilltops that have not previously been developed with ~~wind~~ commercial-scale wind turbine~~ string~~s will not be allowed~~,~~ unless a separate Site Development Review ~~for proposed new turbine~~ is completed that determines that the visual effects will be substantially avoided by distance from public view-points (e.g., ~~over~~ more than 2,000 feet), intervening terrain, screening landscaping, or compensatory improvements to equivalent and nearby (radius of 1 mile) scenic features, as approved by the Planning Director.

Mitigation Measure AES-2a does contain performance standards, stating that the Site Development Review must determine that visual effects will be substantially avoided by at least one of the following.

- Distance from public view points (e.g., over 2,000 feet).
- Intervening terrain, screening landscaping.
- Compensatory improvements to equivalent and nearby (radius of 1 mile) scenic features.

Site development review for aesthetics impacts is commonly used for all types of projects, as the specific elements of projects and siting can differ widely and the aesthetics impacts are largely dependent on project-specific elements.

Please see also Response to Comment GP-2-3.

Response to Comment LA-1-8

The commenter states that the visual analysis does not adequately evaluate the cumulative impacts of buildout of the program area and that it should address the cumulative visual effects of the three Contra Costa County repowering projects (i.e., Buena Vista, Tres Vaqueros, and Vasco Winds). The Buena Vista and Vasco Winds projects, currently in operation, are part of the existing visual environment of the program and project areas. The existing visual environment and visual impacts on existing conditions are discussed and analyzed in Section 3.1, *Aesthetics*. The cumulative visual analysis considers existing conditions, the proposed projects and program, and future projects within the viewshed of public and recreational users of the program and project areas and how those projects combined would affect existing conditions. Accordingly, the cumulative aesthetic analysis specifically discusses the Contra Costa County projects and the proposed program and projects analyzed in Chapter 3.

Response to Comment LA-1-9

The last paragraph in the discussion of Impact HAZ-9a-1 on page 3.8-28 of the Draft PEIR includes the following statement.

> Individual windfarm companies strictly control access to the existing wind energy facilities, and overall site access is limited to persons approved for entry by the windfarm operators or landowners.

The commenter states that limiting access in this way will restrict agricultural use of windfarm sites. Agricultural use of windfarm sites is at the discretion of landowners, who would, as stated in the Draft PEIR text above, have the authority to approve persons for entry. Consequently, access for agricultural use of windfarm sites would not be restricted.

Response to Comment LA-1-10

This comment summarizes Comment LA-1-4. Please see Response to Comment LA-1-4.

Response to Comment LA-1-11

Please see Master Response 1, *Baseline and Determination of Significance*, for a response to this comment.

Response to Comment LA-1-12

The commenter indicates that the discussion of biases in avian fatality rate estimates is confined to bias in detection probability. The commenter is referred to *Potential Biases in the Avian Fatality Analysis Methods* on pages 3.4-53 and 3.4-54 of the Draft PEIR, where the discussion of bias in avian fatality rates includes a discussion of biases associated with detection probability, hazardous turbine removals, seasonal shutdowns, and the small number of sites in the APWRA from which repowered fatality rates are obtained. In addition, please see Master Response 5, *Avian Fatality Monitoring Study*, for a response to issues related to monitoring and detection probability.

Response to Comment LA-1-13

The rates used in the Draft PEIR are from the latest report and thus are free of the "data issues" referred to in the comment. The commenter correctly points out that the avian fatality rate for repowered turbines is based on a small and potentially biased set of turbines; this potential is clearly acknowledged in the PEIR document. The commenter suggests that more variability needs to be included in the threshold analysis. However, no additional appropriate sources of information from which to obtain more variability are available. The addition of more variability into the analysis would not change the conclusion, and the variation and biases in the data are thoroughly discussed in the document. Please see also Master Response 4, *Estimated Avian Mortality Rates Methodology*, for more detailed information.

Response to Comment LA-1-14

The commenter requests that the analysis be extended to all species, including passerines. However, adjusted fatality rates for all species are not available for the Buena Vista site. The fatality rates of non-focal species are readily available for the baseline as well as the other two project sites from which the repowered rates were calculated.

Response to Comment LA-1-15

The commenter states that "Brushy Peak is a major concentration point for golden eagles in the APWRA and so should be avoided." As discussed in Response to Comment LA-1-6 and as described in the Draft PEIR, at this time no turbines are proposed to be located in the area described in this comment as being of concern. However, as described in detail in Section 1.1.2, *Program-Level*

Analysis and Tiering, on page 1-1 of the Draft PEIR, specific projects proposed in the future would undergo project-level environmental analysis tiered from the PEIR.

Response to Comment LA-1-16

The commenter states that the micro-siting analyses for individual wind projects as required in Mitigation Measure BIO-11b on page 3.4-104 of the Draft PEIR need to be open and available for public review. As noted in Master Response 8, *Avian Protection Plan*, project-specific APPs will be required for each project and will be reviewed by the TAC. Additionally, as noted in Master Response 6, *Technical Advisory Committee*, the TAC meetings will be open to the public. The County believes the establishment of the TAC and a review process open to the public will provide the transparency the commenter is suggesting.

Response to Comment LA-1-17

Please see Master Response 8, *Avian Protection Plan*, for a response to this comment.

Response to Comment LA-1-18

The commenter states in this summary of comments provided in more detail in the attachment to this comment letter that additional mammal species should be addressed in the PEIR. The commenter lists mammal species in comment LA-1-42. Please see Response to Comment LA-1-42 for a response to this comment.

Response to Comment LA-1-19

Please see Master Response 11, *Bat Impacts and Mitigation*, for a response to this comment.

Response to Comment LA-1-20

The commenter states that the EIR is inadequate in that it does not evaluate impacts or provide mitigation measures for cultural resources in the Brushy Peak area. As described in *Program Area* on page 3.5-6 of the Draft PEIR, the Brushy Peak Archaeological District is *outside* the program area. The program area in the vicinity Brushy Peak has supported wind turbines for more than 30 years; these turbines will be replaced by far fewer turbines under either repowering alternative. As described in detail in Section 1.1.2, *Program-Level Analysis and Tiering*, on page 1-1 of the Draft PEIR, specific projects proposed in the future would undergo project-level analysis tiered from this PEIR. Mitigation Measures CUL-2a and CUL-2b specify that the County will require project applicants to retain qualified personnel to conduct archaeological field surveys to determine if significant resources are present within individual project areas and ensure that appropriate measures be implemented if any such resources are identified. Although most of the program area has been surveyed, these measures are in place to ensure that no resources are overlooked. Only 10 prehistoric resources have been identified within the program area.

The commenter suggests that Mitigation Measure CUL-1a is inadequate to prevent a substantial adverse change in the significance of a historical resource, especially to Native Americans. However, Mitigation Measure CUL-1a is directed primarily at historic—or *built environment*—resources. Mitigation Measures CUL-2a, CUL-2b, and CUL-2d address the commenter's concern regarding Native American resources.

It should be noted that the Sacred Lands File search (conducted for the County by the Native American Heritage Commission) for the program area yielded no results. Moreover, as detailed in *Summary of Native American Contact* on page 3.5-12 of the Draft PEIR, the County sent letters describing the program to the Native American contacts provided by the NAHC and no responses were received.

Response to Comment LA-1-21

Impacts of blade throw hazard on recreationists, motorists, and residents are specifically described in Impacts HAZ-9a-1, HAZ-9a-2, HAZ-9b, and HAZ-9c in Chapter 8, *Hazards and Hazardous Materials*, of the Draft PEIR.

The commenter observes that the PEIR states that "the County's buffer guidelines are not based on conclusive data." The first paragraph of Impact HAZ-9a-1 on page 3.8-26 of the Draft PEIR, however, includes the following statement.

> Definitive data, however, are limited—particularly for the current generation of wind turbines in terms of blade throw distances—because typical failure reports do not differentiate between blade throw and other types of failures.

This does not mean that the County's standards for buffers, which are implemented through conditions of approval of CUPs for wind energy generation projects, are based on no data, only that available data are limited. As described in detail in Section 1.1.2, *Program-Level Analysis and Tiering*, on page 1-1 of the Draft PEIR, specific projects proposed in the future would undergo project-level environmental analysis tiered from this PEIR. At that time, the County will apply conditions of approval requiring buffers as appropriate for the specific project, as described in the second paragraph of Impact HAZ-9a-1 on pages 3.8-26 and 3.8-27 of the Draft PEIR.

The commenter states that trespass is a common condition and that the PEIR should evaluate the blade throw hazard to trespassers. The PEIR cannot evaluate all possible scenarios, including violation of laws. The analysis in the PEIR assumes that laws are not broken.

The commenter states that the PEIR analysis is based on comparing the risk of existing turbines to that of repowered turbines. This is not correct. The risk of blade throw is based on the size and characteristics of proposed turbines. A comparison to existing turbines is provided, but the analysis evaluates the risk from each new turbine. Blade throw risk was evaluated for all land uses in the program boundary and for specific turbine locations that are currently proposed under the two individual projects. One turbine proposed under the Golden Hills Project could be near the potential trail identified on the EBRPD Existing and Potential Parklands and Trails map of its Master Plan as the San Joaquin County Shadow Cliffs portion of the Iron Horse Trail. Table 2-2 on page 2-13 of the Draft PEIR presents the County's standard buffers, which include buffers from trails. Table 2-2 has been revised as shown below.

Table 2-2. Updated Alameda County Turbine Setback Requirements

Affected Land Use or Corridor	General Setback	~~Elevation Differential~~Setback Adjustment for Turbine Elevation Above or Below Affected Use[a]	~~Adjustable~~ Alternative Minimum[b]
Adjacent parcel with approved wind energy CUP[c]	1.1 times rotor length	1% TTH added or subtracted per 10 ft. of turbine elevation, respectively, above or below affected parcel	50% of general setback
Adjacent parcel without approved wind energy CUP	1.25 times TTH	1~~0~~% TTH per 10~~0~~ ft above or below affected parcel	1.1 times rotor length
Adjacent dwelling unit	3 times TTH	1~~0~~% TTH per 10~~0~~ ft above or below affected unit	50% of general or elevation differential setback
Public road (including I-580), trail, commercial or residential zoning	2.5 times TTH	1~~0~~% TTH per 10~~0~~ ft above or below affected right-of-way	50% of general ~~or elevation differential~~ setback with report by qualified professional, approved by Planning Director
Recreation area or property	1.25 times TTH	1~~0~~% TTH per 10~~0~~ ft above or below affected property	TTH
Transmission line[d]	2 times TTH	1~~0~~% TTH per 10~~0~~ ft above or below path of conductor line at ground level	50% of general setback with report by qualified professional, approved by Planning Director~~TTH~~

Note: TTH = total turbine height: the height to the top of the rotor at 12:00 position. Setback distance to be measured horizontally from center of tower at ground level.

[a] The General Setback based on TTH will be increased or reduced, respectively, based on whole 10-ft increments in the ground elevation of the turbine above or below an affected parcel, dwelling unit, road right-of-way, or transmission corridor conductor line. Any portion of a 10-ft increment in ground elevation will be disregarded (or rounded down to the nearest 10-ft interval).~~Elevation Differential refers to additional setback (above the general setback based on TTH) based on the elevation of the turbine above the affected downslope parcel.~~

[b] *~~Adjustable~~ Alternative Minimum* refers to a reduced setback standard, including any adjustment for elevation, allowed with a notarized agreement or an easement on the affected property, subject to approval of the Planning Director.

[c] No setback from parcel lines is required within the same wind energy CUP boundary. Knowledge of proposed wind energy CUPs on adjacent parcels to be based on best available information at the time of the subject application.

[d] Measured from the center of the conductor line nearest the turbine.

Response to Comment LA-1-22

The commenter states that the impact evaluation related to wildland fire and hazardous materials assessed the impact by comparing the operation of proposed new turbines to the operation of existing turbines. This is not correct. Impacts HAZ-8a-1, HAZ-8a-2, HAZ-8b, and HAZ-8c on pages 3.8-24 through 3.8-26 of the Draft PEIR describe the impacts associated with operation of new turbines. The conclusion in the PEIR is informed by two considerations that would serve to reduce fire hazard associated with the operation of new turbines: CAL FIRE and ACFD already provide fire protection services to the program area, and the fire protection facilities and infrastructure required to protect the existing facilities are in place. Impacts HAZ-2a-1, HAZ-2a-2, HAZ-2b, and HAZ-2c on pages 3.8-13 through 3.8-15 of the Draft PEIR describe the impacts associated with operation of new turbines. The PEIR concludes that implementation of existing regulations will ensure that impacts would be less than significant.

Response to Comment LA-1-23

While taller than the existing wind turbines, the proposed turbines would be established as new features of the built environment for which pilots would be provided warnings and educational notices. As discussed in *Aviation Hazards* on page 3.8-2 of the Draft PEIR, the Federal Aviation Administration (FAA) requires each turbine developer (or for any structure more than 200 feet above ground level) to file a Notice of Proposed Construction, with plans for marking and lighting, and the FAA will issue either a Determination of No Hazard or a Notice of Presumed Hazard. Because these procedures apply throughout the County, there would be no additional effect associated with the expansion of the program area, and the issue has been addressed adequately at a program level in the Draft PEIR. Helicopters and fixed-wing aircraft used to fight fires commonly do so while avoiding high voltage power lines, tall cellular towers, and strings of wind turbines. As long as these features are visible (i.e., lighted at night), they are easily avoided by pilots (Southern Tablelands Renewables 2014).

As described in Chapter 2, *Program Description*, of the Draft PEIR, although the new turbines will be much taller and wider than the old turbines, there will be far fewer of them, and they will be more widely spaced. Consequently, there would be more areas for emergency helicopters to land, if necessary. In addition, the design of new turbines will allow them to be shut down remotely in the event of an emergency, reducing accidents related to fire and worker injury. The new turbines can also be shut down with the lowest possible profile (e.g., with two rotor blades at the 2 and 10 o'clock positions) to be less than 500 feet in height, the lowest elevation at which aerial tankers (fixed-wing aircraft) normally operate when engaged in firefighting (Payne pers. comm.). While the increased height of the new turbines would represent a greater challenge to firefighting by aerial tankers, the undergrounding of power lines and other improved safety features, as well as greater safety for helicopter-based firefighting activities, would roughly compensate for the taller obstacles.

Response to Comment LA-1-24

The PEIR identifies compliance with NPDES requirements as a mitigation measure to ensure that runoff and erosion do not affect water quality. Mitigation Measure WQ-1, on pages 3.9-8 through 3.9-9 of the Draft PEIR, contains specific requirements. The County will require reclamation of roads following decommissioning of turbines as described in detail in *Reclamation Activities* on pages 2-22 and 2-23 of the Draft PEIR.

Response to Comment LA-1-25

Please see Responses to Comments FA-1-1 and FA-1-36 for a response to this comment.

Response to Comment LA-1-26

The commenter states that the proposed program conflicts with County General Plan Policy 133, which requires the minimization of impacts on avian species from wind turbine operations. The commenter also states that the Draft PEIR ignores important bird use areas such as Brushy Peak, which the commenter states is an important area for golden eagles. Lastly, the commenter recommends that the program should be modified to affirmatively steer development away from constrained areas such as Brushy Peak by amending its General Plan land use map and Zoning Designation to not allow windfarms in sensitive areas. The County appreciates the comment and does seek to minimize impacts on avian species consistent with General Plan Policy 133 wherever feasible. As summarized in Section ES.1.4 on page ES-3 of the Draft PEIR, the PEIR analyzes a series of actions that are related geographically and that are likely to have similar environmental effects that can be mitigated in similar ways. Additionally, as noted in the Draft PEIR, two specific projects are analyzed. The series of actions in this case is an anticipated series of CUPs authorizing progressive repowering of the APWRA. The specifics of future projects, including their proximity to Brushy Peak, are unknown at this time. However, as mentioned previously, the County has included measures in the Draft PEIR to avoid, minimize, and mitigate impacts on avian species. Specifically, Mitigation Measure BIO-11a requires applicants to prepare a project-specific avian protection plan, Mitigation Measure BIO-11b requires applicants to site turbines to minimize potential mortality of birds, Mitigation Measure BIO-11c requires applicants to use turbine designs that reduce avian impacts, Mitigation Measure BIO-11d requires applicants to incorporate avian-safe practices into project designs, Mitigation Measure BIO-11e requires applicants to retrofit existing infrastructure that is dangerous for birds, Mitigation Measure BIO-11f requires applicants to discourage prey for raptors, Mitigation Measure BIO-11g requires applicants to implement postconstruction monitoring to determine the project-specific impacts, Mitigation Measure BIO-11g requires applicants to compensate for the loss of all raptors, and Mitigation Measure BIO-11i requires applicants to implement other adaptive management measures if baseline fatalities are exceeded. Each of these measures is consistent with the County's General Plan Policy 133 because they serve to minimize impacts on avian species from wind turbine operations.

The County anticipates that environmental analysis of future individual projects would tier from the mitigation measures set forth in the PEIR and would analyze the specific impacts of individual projects as they are proposed. Consequently, future projects, if proposed near Brushy Peak, would be required to comply with each of these mitigation measures and would be required to demonstrate how they would avoid, minimize, and mitigate avian impacts, including impacts on golden eagles.

Response to Comment LA-1-27

As described in Response to Comment LA-1-21, one turbine proposed under the Golden Hills Project could be near the potential trail identified on the EBRPD Existing and Potential Parklands and Trails map of its Master Plan as the San Joaquin County Shadow Cliffs portion of the Iron Horse Trail. Table 2-2 on page 2-13 of the Draft PEIR presents the County's standard buffers, which include buffers from trails. Application of these buffers will ensure that no turbine is located closer to a trail than the County's standards allow, ensuring that there will be no land use conflict.

Response to Comment LA-1-28

The issue of theft of materials from windfarm facilities is addressed in *Law Enforcement* on pages 3.13-3 and 3.13-4 of the Draft PEIR. New turbines will be much bigger than old turbines, and there will be fewer of them, as each turbine generates more power, as described in Chapter 2, *Program Description*, of the Draft PEIR. Due to their size, design, and decreased numbers, new turbines will be less vulnerable to theft and vandalism. The County's experience over many years of providing police services to the APWRA is that the operators provide a high level of security at the windfarm facilities, which are on private property, and wind energy generation has not resulted in a high demand for police services.

Response to Comment LA-1-29

The commenter expresses concerns regarding the interference of turbines with aerial firefighting and emergency response efforts. Please see Response to Comment LA-1-23 for a response to this comment.

Response to Comment LA-1-30

Please see Master Response 1, *Baseline and Determination of Significance*, for a response to this comment.

Response to Comment LA-1-31

The commenter suggests that an alternative be analyzed in the PEIR that excludes sensitive locations. An alternative (the Avoid Specific Biologically Sensitive/Constrained Areas Alternative) that was analyzed in the PEIR would prescribe a turbine layout that would avoid placing new turbines in areas that would necessitate the construction of new roads traversing biologically sensitive or constrained areas.

The commenter further suggests that the alternative should also include amending the County's General Plan land use map and zoning designations to not allow windfarms in sensitive areas. Please see Responses to Comments LA-1-6 and LA-1-26 for a response to the suggestion of delineating areas prohibiting windfarms.

Response to Comment LA-1-32

The County requires reclamation and financial assurances for completion of reclamation as conditions of approval of CUPs for windfarms. Required reclamation is described in detail in *Reclamation Activities* on pages 2-22 and 2-23 of the Draft PEIR.

Response to Comment LA-1-33

The commenter requests that the discussion of the MBTA include a statement that take associated with the projects cannot be authorized under the MBTA. The description of the Migratory Bird Treaty Act on pages 3.4-1 and 3.4-2 of the Draft PEIR has been revised as shown in Response to Comment FA-1-8.

Response to Comment LA-1-34

The commenter notes that USFWS issued a programmatic eagle take permit on June 26, 2014. The programmatic eagle take permit had not been issued at the time of issuance of the Draft PEIR. The third paragraph of *The Bald and Golden Eagle Protection Act* on page 3.4-2 of the Draft PEIR has been revised as shown below.

> USFWS issued the Eagle Conservation Plan Guidance (ECP Guidance) intended to assist parties to avoid, minimize, and mitigate adverse effects on bald and golden eagles (U.S. Fish and Wildlife Service 2013a). 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 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, one ~~no~~ programmatic eagle take permit~~s have~~ has been issued by USFWS on June 31, 2014 (http://www.fws.gov/cno/conservation/migratorybirds.html).

The commenter also noted that the entities repowering the APWRA should seek an eagle take permit to adequately address mitigation and compensation for the unavoidable take of eagles during the life of the CUP. The County notes that application for a programmatic eagle take permit is made to USFWS under the Bald and Golden Eagle Protection Act and that it is a voluntary process. The County acknowledges in the Draft PEIR that eagles will continue to be at risk in the APWRA following repowering. While the County cannot require applicants to apply for eagle take permits, many of the PEIR mitigation measures in the Draft PEIR have been modeled on the avoidance, minimization, and mitigation measures outlined in USFWS's ECP Guidance. Additionally, Mitigation Measure BIO-11h, beginning on page 3.4-107 of the Draft PEIR, presents several mitigation options, including an option for applicants to use a USFWS-approved ECP and Bird and Bat Conservation Strategy (BBCS), to satisfy compensatory mitigation requirements. The County believes that including this option may provide incentive for wind operators to apply for eagle take permits.

Response to Comment LA-1-35

The commenter requests a statement that CDFW cannot authorize take for fully protected species. That information is already presented in the referenced discussion. No revisions to the Draft PEIR are necessary.

Response to Comment LA-1-36

The commenter requests a statement that CDFW cannot issue take permits under Sections 3511, 3513, and 4700 of the California Fish and Game Code. *Protection of Birds and Raptors* on page 3.4-5 of the Draft PEIR has been revised as shown below.

> Section 3503 of the California 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. 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. CDFW cannot issue permits for the take of birds by the program or the Golden Hills and Patterson Pass projects.

Response to Comment LA-1-37

The commenter correctly states that the East Alameda County Conservation Strategy (EACCS) programmatic BO does not cover avian and bat effects caused by wind energy projects and cannot provide take authorization. This is stated in the third paragraph of *East Alameda County Conservation Strategy* on page 3.4-6 of the Draft PEIR.

Response to Comment LA-1-38

The commenter notes that the Draft PEIR states that the draft APP was developed to allow wind energy projects to comply with applicable statues regarding migratory birds and that compliance with MBTA is not possible if there is take of migratory birds. The second paragraph of *2007 Settlement Agreement* on page 3.4-7 of the Draft PEIR has been revised as shown below to clarify how the APP would be used by wind energy projects in the context of applicable statues.

> As an alternative to the NCCP called for in the Settlement Agreement, the County has developed a draft *Avian Protection Program* (APP) to provide a framework and process for wind energy projects to ~~comply with~~address applicable statutes (e.g., MBTA and BGEPA) through the repowering process.

Please refer to Master Response 8, *Avian Protection Plan*, for a response to the comment regarding inclusion of the APP in the PEIR.

Response to Comment LA-1-39

The commenter requested that the section *Special-Status Species* should be renamed to include non-special status species such as red-tailed hawk and prairie falcon. Rather than rename the section, which is a standard component of CEQA documents, two categories have been added to the list of special-status species definitions that appears on pages 3.4-20 and 3.4-21 of the Draft PEIR as shown below.

- 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.
- Species that are candidates for possible future listing as threatened or endangered under ESA (77 FR 69993, November 21, 2012).
- 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 the CNPPA (California Department of Fish and Wildlife Commission 1900 et seq.).
- Plants with a California Rare Plant Rank of 1A, 1B, 2A, and 2B (California Department of Fish and Wildlife 2013).
- Animals listed as California species of special concern on CDFW's Special Animals List (California Department of Fish and Game 2011).
- 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).
- APWRA focal species.
- Species of local conservation concern in the APWRA.

Response to Comment LA-1-40

The commenter noted that the species account for large-flowered fiddleneck should be updated with the latest occurrence data from Lawrence Livermore Laboratory rare plant reports. The County has reviewed the most recent available report from 2012 and has updated the species account as suggested. Inclusion of this information does not change the findings or conclusions in the Draft PEIR. The discussion of *Large-Flowered Fiddleneck* on page 3.4-21 of the Draft PEIR has been revised as shown below.

> 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 program 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 and has not been observed since 1997 (Carlsen et al. ~~1999~~2012). California annual grasslands in the program area are potential habitat for this species.

The updated citation has been corrected in the references section of Section 3.4, *Biological Resources*.

Response to Comment LA-1-41

The commenter requests project-specific information about the occurrence of longhorn fairy shrimp. At the time the Draft PEIR was written, neither the Patterson Pass nor Golden Hills project areas had been surveyed for biological resources. Since that time, the Patterson Pass project area has been surveyed by an ICF wildlife biologist, and although rock outcrops are present in the project area, they do not contain pool habitat for longhorn fairy shrimp. The Golden Hills project area has not yet been surveyed, but it is assumed that at a minimum, the project area contains grassland pools that are suitable for longhorn fairy shrimp. Clarifications have been added to the EIR to reflect the new information acquired at Patterson Pass. The fourth paragraph of *Longhorn Fairy Shrimp* on page 3.4-25 of the Draft PEIR has been revised as shown below.

> Grass-bottom seasonal pools and rock outcrop pools that are suitable for longhorn fairy shrimp may be present within the Golden Hills project area. One seasonal wetland in the Patterson Pass project area provides suitable habitat for longhorn fairy shrimp. Although rock outcrops are present in the Patterson Pass project area, they do not contain suitable pool habitat for longhorn fairy shrimp. There are no CNDDB records for occurrences of longhorn fairy shrimp in either of the project areas (California Department of Fish and Wildlife 2013c). There is no designated critical habitat for longhorn fairy shrimp in the Golden Hills or Patterson Pass project areas (Figure 3.4-4).

Response to Comment LA-1-42

The commenter requests that the Draft PEIR address San Joaquin pocket mouse, San Francisco dusky-footed woodrat, and San Joaquin kangaroo rat. San Joaquin pocket mouse is no longer considered a species of special concern (California Department of Fish and Wildlife 2011) and therefore is not addressed as such in the EIR. The program area is outside the range of San Joaquin (Tulare) kangaroo rat and other kangaroo rat species. The program area is within the range of San Francisco dusky-footed woodrat, and a limited amount of suitable habitat is present within the program area. Relative to the sizes of the program area and project areas, small amounts of chaparral, scrub, oak woodland, and riparian forest/woodland are within the program area (Table 3.4-1), and small amounts of mixed willow riparian scrub are within the Golden Hills and Patterson Pass project areas (Tables 3.4-2 and 3.4-3 respectively). It is anticipated that the majority of construction activities would take place on grassland habitat along ridgelines and that loss of chaparral, scrub, oak woodland, and riparian forest/woodland habitat would be minimal. Because temporary and permanent impacts on suitable habitat for San Francisco dusky-footed woodrat are expected to be very small (Table 3.4-7), and the potential for injury and mortality would consequently also be very unlikely, this impact is less than significant. Accordingly, no revisions to the Draft PEIR are necessary.

Response to Comment LA-1-43

The commenter indicates that there is at least one new record of Swainson's hawks nesting in the program area. The second paragraph of *Swainson's Hawk* on page 3.4-35 of the Draft PEIR has been revised as shown below.

> Although suitable nesting and foraging habitat for Swainson's hawks is present in the program area, Swainson's hawks more typically occur in flat terrain and rarely occur in the foothills of the Coast Ranges. There is one CNDDB record of a Swainson's hawk nest in the northeastern portion of the program area (California Department of Fish and Wildlife 2013c), and East Bay Regional Park District (EBRPD) reported a Swainson's hawk nesting in the program area (Barton pers. comm.). There are 11 additional CNDDB records of Swainson's hawk nests east and northeast of the program area, including one that is just outside of the program area. Swainson's hawk has been documented as a fatality only once in more than 7 years of intensive fatality monitoring (ICF International 2013), and only 11 sightings of Swainson's hawks have been recorded in the program area in more than 7 years of avian use monitoring conducted throughout the program area by the AFMT (Alameda County unpublished data).

Response to Comment LA-1-44

The commenter requested that additional detail be added to the red-tailed hawk species account with regard to flight behavior. Mitigation Measure BIO-11b requires the careful siting of turbines using landscape features and location-specific bird use and behavior data to identify locations with reduced collision risk. Siting would be based on this information, and would be reviewed by the TAC and the County to ensure that the most up-to-date information is considered at the time individual projects are designed. Consequently, the use of flight behavior to inform siting is already addressed in the Draft PEIR. No revisions to the PEIR are required.

Response to Comment LA-1-45

The commenter requests that additional information regarding golden eagle habitat and occurrences be added to the species account. The description of *Golden Eagle* on pages 3.4-36 and 3.4-37 of the Draft PEIR has been revised as shown in Response to Comment FA-1-9.

Response to Comment LA-1-46

The commenter suggests identifying prairie falcon as a species of local conservation concern in the APWRA. Several changes have been made throughout the chapter to address this issue; please see Response to Comment LA-2-9 for a discussion of the clarified definitions of special-status species. The commenter also provides additional information from unpublished EBRPD data regarding nesting records of prairie falcon and results of EBPRD's telemetry study showing use of the APWRA by prairie falcons nesting more than 10 miles from the program area. The text of the species account on pages 3.4-37 and 3.4-38 of Draft PEIR has been revised to incorporate this new information as shown below.

> Prairie falcon is not a state- or federally listed species. However, it is protected under the MBTA and the California Fish and Game Code and is a species of local conservation concern in the APWRA due to the high number of recorded fatalities. Prairie falcon inhabits arid environments of western North America in open plains and shrub-steppe deserts with cliffs, bluffs, or rock outcroppings. An efficient and specialized predator of medium-sized desert mammals and birds, prairie falcons range widely, searching large areas for patchily distributed prey. Nesting, postnesting, and wintering ranges are generally widely separated, with movements between ranges being potentially dependent on seasonal availability of prey. These diurnal hunters prey predominantly on ground squirrels, small birds, reptiles, and insects. Hunting strategies include still-hunting from perches, soaring, and low active flight (Phipps 1979). Prairie falcons nest on cliffs with eagles, ravens, and red-tailed hawks, but have also been known to use trees, caves, buildings, and transmission lines (Nelson 1974; Pitcher 1977; Haak and Denton 1979; MacLaren et al. 1984; Roppe et al. 1989; Bunnell et al. 1997).
>
> ~~Thirteen observations of prairie falcons were recorded during monitoring at two sites within the program area, including one nest observed with both male and female adults and one young (Howell and DiDonato 1991).~~ The CNDDB (2013c) lists two prairie falcon occurrences within the program area, and 11 more within 10 miles of the program area boundary. Twenty-six observations of prairie falcons were recorded during fixed point surveys around the Diablo Winds repowering project from 2005 to 2007 (Western Ecosystems Technology 2008). At least four recent known nest sites have been identified within the APWRA and at least two within 2 miles of the program area. A telemetry study conducted by East Bay Regional Parks District (unpublished data) has documented extensive use of the program area by prairie falcons nesting more than 10 miles from the program area (Final PEIR Appendix E, Comment LA-1-46).

Response to Comment LA-1-47

The commenter suggests that the discussion of avian fatalities be expanded to include all species of birds that have been taken by windfarm operations in the APWRA. All bird species are included in the analysis; however, they are summarized into raptor and non-raptor categories, rather than addressed as individual species. Please see Response to Comment FA-1-11 for more information.

Response to Comment LA-1-48

The commenter states that the comparison of fatality rates at old and new generation turbines—which forms the foundation of the analysis of operational impacts on birds—is based on the most recent science available, but expresses concerns about this comparison. The commenter is referred to *Potential Biases in the Avian Fatality Analysis Methods* on page 3.4-53 of the Draft PEIR for a discussion of the potential pitfalls of the analysis. Please see also Master Response 4, *Estimated Avian Mortality Rates Methodology*, and Master Response 5, *Avian Fatality Monitoring Methodology*.

Response to Comment LA-1-49

The commenter suggests that raw data as provided in Table 3.4-6 is insufficient for analysis. The table is intended to provide raw, unadjusted fatality numbers, since little statistically sound information exists on adjusted bat fatality rates at APWRA under the earlier avian monitoring program. Moreover, the primary purpose of the table is to support the assertion of species that are known to occur in the program area.

Response to Comment LA-1-50

The commenter states that the Draft PEIR should reference reports that provide estimates based on number of birds killed per turbine per year. As described in *Avian Fatality Analysis Methods* on pages 3.4-51 and 3.4-52 of the Draft PEIR, the number of birds killed per turbine is typically used at facilities using modern turbines. In this case, however, the Draft PEIR compares the baseline estimate of annual fatalities at existing turbines with the number of annual fatalities expected to occur after repowering. As disclosed in the Draft PEIR, the existing fatality rates are only available on a per MW basis, and thus the comparison for the PEIR must be undertaken on a per MW basis.

Please see also Response to Comment LA-2-18.

Response to Comment LA-1-51

The commenter correctly points out an inaccuracy in a discussion of the relationship between turbine size and turbine density. That discussion was intended to emphasize that as turbine size increases, the density of turbines decreases; this relationship makes use of the fatalities per turbine metric more sensible, although this approach is not feasible in the APWRA due to the historic disparity of turbine types and sizes. The second paragraph of *Avian Fatality Analysis Methods* on pages 3.4-51 and 3.4-52 of the Draft PEIR has been revised as shown below.

> The number of fatalities per MW per year has been used most often because it facilitates comparisons across a number of different turbine types with different <u>sizes and </u>rated nameplate capacities. However, the number of birds killed *per turbine* per year is being used more often at facilities using modern turbines because these larger turbines are reaching a size at which a higher density of turbines is no longer feasible. <u>Consequently, the number of towers becomes relatively more important than the actual rated capacity.</u> ~~While modern turbines may vary in rated nameplate capacity from 1 to 3 MW, their spacing is not closely correlated with their capacity because of various technical constraints. For example, a larger number of 1 MW turbines than 2.3 MW turbines cannot be installed in a given space, with the result that a given project, depending on its size, might support a roughly equivalent number of 1 MW or 2.3 MW turbines. Consequently, in view of their size and design, the number of turbines might be a more important factor than nameplate capacity in estimating fatality rates.~~

Response to Comment LA-1-52

The commenter states that data used to calculate baseline fatality rates should be updated with recently available information. Please see Master Response 3, *Avian Mortality Rates Methodology for Existing Conditions*, for a response to this comment.

Response to Comment LA-1-53

The commenter discusses fatality rates from repowered projects that were used to estimate potential impacts following repowering. Please see Master Response 4, *Estimated Avian Mortality Rates Methodology*, for a response to this comment.

Response to Comment LA-1-54

Potential Biases in the Avian Fatality Analysis Methods on page 3.4-53 of the Draft PEIR provides a description of the factors that have the greatest effect on avian fatality estimates. The commenter indicates that this discussion is incomplete because it does not discuss additional factors that could also potentially bias the estimates. A great many factors could potentially bias the estimates, but it is not necessary to describe them all as long as the factors that influence the rates to the greatest degree are discussed. The PEIR makes clear that the estimates of impacts are not precise, but estimates order of magnitude effects using the best information available, and discloses that that information is limited and potentially biased.

Response to Comment LA-1-55

The commenter indicates that each fatality rate in table 3.4-10 should include three significant digits and 95% confidence intervals. While 95% confidence intervals for baseline fatality rates are available, they are not available for all species from the Buena Vista project. There is considerable uncertainty regarding how 95% confidence intervals are calculated using the estimators currently available, and current methods almost certainly underestimate confidence interval width. Given this uncertainty and the clearly stated biases outlined in the document regarding fatality rate estimation, the County believes that including confidence intervals would lead to an erroneous perception of the precision with which these estimates are made.

The County chose a representative suite of species for detailed analysis and does not believe that an exhaustive treatment of all species is warranted. However, the analysis does address native non-raptors.

Response to Comment LA-1-56

Please see Master Response 1, *Baseline and Determination of Significance*, and Response to Comment LA-1-3 regarding the identification of the baseline for the analysis in the PEIR.

Response to Comment LA-1-57

The commenter indicates that the fatality rates used in the Draft PEIR are different than the fatality rates provided in the latest report from the Alameda County Avian Fatality Monitoring Team. The fatality rates in the Draft PEIR are from data that have been fully vetted and corrected. Moreover, these rates reflect the Alameda County portion of the APWRA, whereas rates in the latest Alameda County Avian Fatality Monitoring Team report reflect the entire APWRA.

Response to Comment LA-1-58

Please see Response to Comment NGO-1-3 for a response to this comment.

Response to Comment LA-1-59

Please see Response to Comment LA-1-15 for a response to this comment.

Response to Comment LA-1-60

Please see Response to Comment LA-1-46. The observation of risky behavior in prairie falcons does not change the conclusion that uncertainty remains regarding the effects of repowering on collision risk for this species because of the much smaller sample size on which to base conclusions about fatality rates.

Response to Comment LA-1-61

The commenter raises concerns regarding the continuation of the current program of on-call personnel who respond to reports of injured or dead raptors and other birds, and who transport animals to rehabilitation centers. The County notes that each operator is required to hold a valid Special Purpose Utility (SPUT) permit from USFWS to collect dead or injured birds at wind energy facilities. The requirements of the permits include requirements to report dead or injured birds found, as well as requirements to take injured birds to rehabilitation facilities. The County believes that USFWS is the primary agency with jurisdiction over dead and injured birds, and that the SPUT permit facilitates the required collection and rehabilitation of birds.

Response to Comment LA-1-62

The commenter raises concerns that the micro-siting analyses for individual wind projects as required in Mitigation Measure BIO-11b on page 3.4-104 of the Draft PEIR needs to be open and available for public review. Please see Response to Comment LA-1-16.

Response to Comment LA-1-63

Please see Master Response 5, *Avian Fatality Monitoring Methodology*, for revisions to the postconstruction monitoring protocols in response to comments on this topic.

Response to Comment LA-1-64

The County has developed a new approach for permitting and review of repowered projects as described in the Draft PEIR. The commenter suggests maintaining the current SRC approach. This is not a comment on the Draft PEIR, but it is in the public record and will be considered by the decision makers in taking action on the program.

Response to Comment LA-1-65

Please see Response to Comment FA-1-11 for a discussion of the suite of species addressed in the analysis of avian impacts. Mitigation Measure Bio-11h has been revised as shown in Master Response 9, *Avian Compensatory Mitigation*, to remove the option of contributing to raptor recovery efforts. The remaining conservation measure options will require either directly applicable research or conservation of land, which will benefit the full suite of species present in the APWRA. The compensation strategy for golden eagles is based on the REA conducted by USFWS for power pole retrofitting, which takes into account the loss of reproductive potential.

Response to Comment LA-1-66

The commenter suggests that compensation strategies should consider cumulative impacts of loss of individuals (e.g., loss of reproductive potential), especially for long-lived species such as golden eagle. The compensation strategy for golden eagles is based on the REA developed by USFWS, which takes into account the loss of reproductive potential, in developing mitigation levels for power pole retrofitting.

Response to Comment LA-1-67

The commenter makes several suggestions regarding the option to contribute to raptor recovery efforts through contributions to rehabilitation facilities. After careful reevaluation, the County has determined that this option is not an appropriate conservation measure because it would not benefit any species other than those raptors under the care of such facilities, and consequently it is inconsistent with the conservation approach outlined in Mitigation Measure BIO-11h. Accordingly, that option has been removed from Mitigation Measure BIO-11h as shown in Master Response 9, *Avian Compensatory Mitigation*; however, the per-raptor dollar value has been retained as a metric for determining the amount of contribution to conservation efforts as described in the subsequent option. The text of Mitigation Measure BIO-11h on pages 3.4-109 and 3.4-110 of the Draft PEIR has been revised as shown in Master Response 9, *Avian Compensatory Mitigation*.

Response to Comment LA-1-68

The commenter suggests some additional options regarding the regional conservation of raptor habitat outlined in Mitigation Measure BIO-11h beginning on page 3.4-106 of the Draft PEIR. The County appreciates the suggestions, but notes that the mitigation measure already allows for additional conservation measures that may become available in the future as described in the last bullet of the measure. However, the County has revised the last bullet of the mitigation measure on page 3.4-110 of the Draft PEIR as shown in Master Response 9, *Avian Compensatory Mitigation*, to include additional options suggested by the commenter.

Response to Comment LA-1-69

The commenter suggests modifications to the thresholds used in the EIR for implementing ADMMs. Please see Responses to Comments LA-1-70 through LA-1-73 for specific responses to these suggestions.

Response to Comment LA-1-70

The commenter suggests that thresholds should be applied to individual species rather than groups of birds so that mitigation can be tailored to individual species. However, the mitigation measures set forth in the Draft PEIR apply to all raptors killed and would benefit all bird species using the APWRA.

Response to Comment LA-1-71

Please refer to Master Response 10, *Adaptive management*, for a response to this comment.

Response to Comments LA-1-72 and LA-1-73

The commenter expresses concerns about the trigger for turbine curtailment and the efficacy of real-time turbine curtailment. The County agrees that implementation of this measure may be difficult using today's technology; however, technology may become available in the future to make the measure feasible. Please see Master Response 10, *Adaptive Management*, for revisions to Mitigation Measure BIO-11i.

Response to Comment LA-1-74

The commenter suggests that the County should provide further information regarding the proposed mitigation payment described in ADMM-3 in Mitigation Measure BIO-11i on page 3.4-111 of the Draft PEIR. The amount described in ADMM-3 was the same amount described in the Draft program-level APP, which was reviewed by the stakeholders. Mitigation Measure BIO-11i has been revised as shown in Response to Comment FA-1-23 to allow the County to modify the ADMMs to take into account current research and the most effective impact reduction strategies. Consequently, the mitigation measure allows the County to revisit the amount in the future as necessary.

The commenter also questions whether the payment is adequate for cumulative impacts on golden eagles. As disclosed in Response to Comment FA-1-6, the County believes the golden eagle cumulative impact situation in the APWRA will improve following repowering. The County has still found the impact on golden eagles to be significant and unavoidable as described in Master Response 1, *Baseline and Determination of Significance*, and Mitigation Measure BIO-11h requires each project to compensate for the loss of each golden eagle through a combination of mitigation measures.

LA-2—Alameda County APWRA Scientific Review Committee

P289 - v.6 7-16-14

SRC Comments on Draft Repowering Program Environmental Impact Report

Alameda County APWRA Scientific Review Committee

I. SRC Consensus Input

The Alameda County Scientific Review Committee (SRC) developed its consensus input on the Draft Repowering Program Environmental Impact Report (DPEIR) at a July 9, 2014 conference call meeting. The SRC, after reviewing comments made by individual SRC members in an earlier version of this document, agreed to endorse all of the individual comments as input on the DPEIR. Alameda County (in P285_Alameda County Memo on Questions for Repowering DPEIR Review) had asked the SRC to provide input on the report's methodology, assumptions and proposed mitigations in reference to avian biological resources.

While individual SRC member comments covered a broad range of subjects in the PEIR, there were several broad issues that the SRC agreed were of particular importance in revising the PEIR:

Analysis/Assumptions

- **Project Baseline:** The data used to derive the baseline could lead to a higher baseline than the estimates from more recent years. Also there is an issue of impacts below baseline being considered less than significant, despite the potential for significant avian fatalities occurring. 1
- **Selected avian species for impact analysis:** It is not clear why certain species, aside from the four focal species, are the focus of impact analysis, and the broad coverage of the Migratory Bird Treaty Act (MBTA) and other laws and regulations should be noted. 2

Mitigations

- **Specificity or strengthening of certain mitigation requirements suggested.** Field surveys, biological monitors, seasonal/breeding protections are areas that need more specific requirements. 3
- **TAC composition and role.** Participation of independent scientists and NGOs is highly recommended. Several qualified and independent scientists should be engaged to provide input throughout the life of the TAC. 4

1

LA-2—Alameda County APWRA Scientific Review Committee

P289 - v.6 7-16-14

II. Comments by Individual SRC Members

Comments submitted by individual members of the Alameda County Scientific Review Committee (SRC) prior to the conference call meeting are as follows:

Chapter 2 - Program Description 5

The program objectives are ambiguous. Page 2-2 contains a section (2.2.2) titled "Program Objectives" and describes them as such:

> "The two primary objectives of repowering are to facilitate efficient wind energy production through repowering and to avoid and minimize impacts on terrestrial and avian wildlife caused by repowered wind turbine construction, operation, and maintenance."

The objectives were restated on page 4-2 (section 4.1.2) in such a way that separates the term "repowering" out of the program objectives:

> "the two primary objectives of the program are to facilitate the replacement of existing wind energy turbines with more efficient turbines, increase energy production, and avoid and minimize impacts on avian wildlife caused by repowered wind turbine construction, operation, and maintenance in the program area."

Is repowering not an integral program objective? This relates to whether the "No Repowering, Full Decommissioning" should be considered as an environmentally superior alternative among the no-project alternatives. It is not treated as the "No Project" alternative and it will not achieve the objective of repowering, yet it is designated in the draft as the environmentally superior (Page 4-34).

Chapter 3-4 - Biological Resources

3.4.1 Existing Conditions

Page 3.4.1: It might be good to have a comparison of APWRA instead of just the program area. This would indicate the relative importance of different habitats. In all of these tables, percents could be added to make comparisons easier. 6

Page 3.4-7, last paragraph: The paragraph references a draft Avian Protection Program (APP) and states that key provisions have been incorporated into the draft PEIR. It would be useful to see the APP in its entirety in order to make a full evaluation of the PEIR. The origin of provisions in the PEIR that are associated with the APP are likely to be unclear. 7

2

LA-2—Alameda County APWRA Scientific Review Committee

P289 - v.6 7-16-14

Page 3.4-10, Common Wildlife Associations (Grasslands): Grasslands are the dominant land cover type in the APWRA and the primary foraging habitat for raptor species. While this section discusses the general association of grasslands and various wildlife species, it might be useful to expand the discussion to include the landscape features and other environmental factors that concentrate bird use or that affect bird movements and behavior. These are the things that are related to bird mortality in the APWRA and for which some background discussion would be helpful to many readers. For example, eagle movement is directly related to topography through the grassland landscape. Topography is also a key factor in the siting of turbines. As eagles move through the grassland landscape using topography and low elevation flight to surprise prey, they may encounter turbines and become susceptible to collision. The repowering of the APWRA will not alter eagle behavior or movement or the grassland landscape they use, but it will alter the turbine landscape and potentially reduce encounters with turbines. Other factors worth noting are wind patterns through the APWRA and how they can concentrate bird activity or determine bird behavior and affect susceptibility to collision. Rock outcrops (also described in the grassland section) may concentrate rodent prey, particularly ground squirrels, and also affect local bird abundance and behavior. These are examples of how the discussion of wildlife associations can be more relevant to the project rather than simply associating species with habitats. 8

This same comment applies to all of the natural communities described. A bit more discussion of the relationships of habitats, habitat elements, and related ecological factors to wildlife species use, abundance, and behavior and how these are associated with the project and its impacts would be helpful to the uninformed reader of the draft PEIR.

Special-Status Wildlife

Page 3.4-24: There are a few minor inconsistencies between the species included on Table 3.4-5 and those that are described in the text. While not included on Table 3.4-5, the text includes several species that are typically not considered 'special-status', such as red-tailed hawk, American kestrel, barn owl, and prairie falcon. These non-special-status species appear to be included by virtue of them being protected under the MBTA or DFG Code. However, all native birds receive some protection under these regulations. So, it might be useful to make this point – particularly since the primary issue with repowering and this PEIR is avian mortality. Consider making it clear which birds have actual special-status, describe how all native birds receive protection under state and federal laws and regulations, and describe the significance of this distinction. 9

There is also the use of the term "APWRA focal species" in the species descriptions. If this refers to the species addressed in the monitoring program, then prairie falcon, barn owl, and loggerhead shrike are not focal species. If there is another reason why these species are referred to this way, then this should be made clear.

3

LA-2—Alameda County APWRA Scientific Review Committee

P289 - v.6 7-16-14

Birds and Bats Subject to Turbine-Related Mortality
Avian Mortality and Monitoring

Page 3.4-45, second paragraph: The second sentence notes that mortality reduction due to implementation of the two primary management actions is less than 'predicted'. To be clear, no predictions were made regarding the extent of mortality reduction. This implies that there were some data or other sources of information that might be used to calculate a potential reduction, which there were not. A mortality reduction was assumed, but the extent of that reduction was not calculated or predicted. The 50% reduction goal was a target established by the Settlement Agreement. It was not a prediction. 10

This section might also point out the extent of turbine attrition that has occurred since the monitoring program has begun, which likely also contributed to the reduction in mortality.

Page 3.4-46: Overall it would be good to consider all migratory birds, not just a focus on raptors (or the focal raptors). 11

Bat Fatality and Monitoring

Page 3.4-46, fourth paragraph: While there is a somewhat vague reference to it in the last sentence, this section might provide a more complete description of bat mortality at new generation turbines. There are quite a lot of data on bat mortality at larger new generation turbines and the potential for mortality from both collision and changes in air pressure. The low mortality at the older APWRA turbines may not be surprising due to their size, lack of lighting, and more localized changes in air pressure compared to the larger turbines. It would be useful to describe this distinction and these differences. 12

3.4.2 Environmental Impacts
Methods for Analysis

Page 3.4-47, Table 3.4-6: The comparison between the sites is a bit unclear unless you refer to the footnotes. And even then, most readers may not be clear on how to compare MW relative to the number of turbines. To be clearer, consider including the MW totals and the number of turbines for each site within the table itself – following the title of the project (e.g., APWRA Monitoring – 417 MW [# old generation turbines]; Buena Vista Repowering Project – 38 MW [# new generation turbines]; Vasco Winds – 78 MW [#new generation turbines]), or something similar to enhance clarity. Also, the table suggests the differences between new and old generation turbines, but there is no accompanying text to describe this. 13

4

LA-2—Alameda County APWRA Scientific Review Committee

P289 - v.6 7-16-14

Avian Fatality Analysis Methods
Fatality Rates

Page 3.4-51: There is a need to present fatalities BOTH by MW and turbine (as well as type). 14

Page 3.4-52, fourth paragraph: The baseline estimates were determined as follows: "For the fatality rates, the average of the annual estimates of each fatality rate from the 2005–2011 bird years (n=7 years) provided by the Alameda County Avian Fatality Monitoring Program (ICF International 2013) was based on old-generation turbines only (i.e., results from the Diablo Winds and Buena Vista turbines were excluded because they are not considered old-generation turbines. This average was used because the annual fatality rates vary considerably from year to year." 15
Comment: Because you have chosen to use the 2005-2011 monitoring years to derive the baseline estimate, the fatality rates for some of the focal species will likely be higher than if you used the more recent monitoring years. Your method does not take into consideration the reduction in fatalities in the later monitoring years, presumably due to the management actions taken. Those seven years also include the anomalously high 2006 year. In addition, the baseline calculation also uses the installed capacity at the time of the NOP, which is lower than previous years and thus further increases the baseline estimate. Consequently, these baseline analysis methods will make it easier for post-construction monitoring data not to exceed baseline. It may be more appropriate to use the average of the last 3 years as the baseline, because it would include the effects of management actions and better represent existing conditions. The 3 year average is also what the Monitoring Team uses to compare to its baseline. At least mention this as a bias in the PEIR.

Page 3.4-52, fourth complete paragraph and Table 3.4-10 on Page 3.4-53: It is unclear why the other (non-focal) species were selected to represent differences in fatality rates. These are not the most representative birds that are subject to mortality in the APWRA. For example, Table 3.4-10 indicates very few Swainson's hawk and prairie falcon fatalities. So then why use these species? The APWRA is generally outside the range of the Swainson's hawk, so its conservation status may not be a reasonable rationale for including it here. 16

Page 3.4-52, last paragraph: The last sentence states that 95% confidence intervals are included in Table 3.4-10. They are not. 17

Page 3.4-52: Suggests returning to fatalities per turbine rather than per MW, but then presents data as fatalities per MW; needs clarification of metric(s) to be used following repowering. 18

5

LA-2—Alameda County APWRA Scientific Review Committee

P289 - v.6 7-16-14

Page 3.4-52: Should review and discuss any fatality data from other WRAs with new generation turbines and fatality rates; anything useful such as relative to old gen turbines in the literature including unpublished reports? 19

Potential Biases in the Avian-Fatality Analysis Methods

Page 3.4-54, second paragraph, fourth sentence: "The Alameda County Avian Fatality Monitoring Program measured detection probabilities in only one year, and these probabilities were used to estimate the number of killed birds in all years of the study." **Comment:** In the last few years of Alameda County Avian Fatality Monitoring Program, a composite of three different detection probability methods have been used to estimate APWRA-wide annual fatalities across all years of the study. Detection probabilities were estimated using data collected during the QAQC study, the carcass removal/scavenging trail study, and the 48-hour search interval study. A QAQC approach to detection probabilities for future monitoring of repowered turbines would more accurately estimate fatalities and improve comparability to the current study (baseline). 20

Page 3.4-54, second paragraph, fourth sentence: Some type of integrated detection probability study design conducted concurrently with monitoring, such as that used at the Vasco project, would be even more preferable to relying on Alameda County Avian Fatality Monitoring Program detection probabilities developed through the previous QAQC study. 21

Page 3.4-54: One additional potential bias should be mentioned: search radius. There are different search radius is for larger turbines, and the literature about appropriate search radii is uncertain. There is a potential for an unknown bias. 22

Bat Fatality Analysis Methods

Page 3.4-54: In the preceding section on bird fatalities, the statement is made that bird fatalities may decline with increasing size of turbines. There is also evidence that bat fatalities may increase with increasing turbine size. While perhaps somewhat more speculative, it seems this section, to be consistent with the preceding section, should at least note this possible relationship and provide the appropriate citations. 23
In the bat impact assessment on page 3.4-127, the statement is made that "all available data suggest that repowering would result in a substantial increase in bat fatalities". So it is acknowledged in the document, but to maintain consistency, the analysis methods section should address bats similarly to birds.

Determination of Significance

6

LA-2—Alameda County APWRA Scientific Review Committee

P289 - v.6 7-16-14

Page 3.4-55: The analysis establishes a baseline using monitoring data from 2005 to 2011 and uses this baseline as the threshold for determining significance ("Where the projected rate would exceed the baseline rate, the impact would be significant; if the projected rate is below the baseline rate, the impact would be considered less than significant"). 24

Understanding the CEQA logic and rationale related to establishing a baseline that differentiates the 'existing condition' from the 'project condition,' there are two issues with it in this case.

First, the baseline condition is one that results in substantial annual bird mortality from operation of the turbines, including protected species, and violates state and federal law. Dropping the level of avian mortality below this baseline threshold may still result in substantial annual bird mortality and continue to violate state and federal law. It's difficult to resolve how this (a continuing high level of avian mortality – including protected species) would be considered a less-than-significant impact. It may drop below the baseline, but it still may not satisfy the CEQA definition of significance. While the ultimate determinations are considered significant and unavoidable (e.g., Impact Bio-11a-1) due to the range of projected mortality reductions and the possibility of not dropping below the baseline threshold, the rationale for using the baseline may not be appropriate.

The existing condition in APWRA can be reduced to zero turbine-related mortality simply by flipping a switch and shutting down the turbines. So it isn't quite the same as a change in the physical landscape from a development project or construction of a dam or similar condition. It seems like the baseline for the taking of animals from operation of a project that otherwise doesn't substantially alter the physical landscape should be based on the effect of that operation on those animal populations rather than accepting a high level of mortality as the existing condition and the threshold for determining significance. In other words, because the impact is the operational-related mortality of birds and bats, mortality that is below the baseline may still constitute a significant biological impact as defined in CEQA.

So in general, the ultimate conclusion that while repowering will likely reduce overall avian mortality, turbine-related mortality could still be significant and unavoidable following repowering is supported. The concern is with the rationale used to develop the significance threshold (i.e., baseline mortality).

Secondly, the baseline uses data (2005-2011) that precedes some management designed to reduce mortality. The existing condition for which the baseline is established no longer exists. It seems more appropriate to use a more recent and up-to-date estimate of mortality to establish the baseline. However, as noted above, it is not convincing that the approach is entirely valid in the first place.

7

LA-2—Alameda County APWRA Scientific Review Committee

P289 - v.6 7-16-14

Page 3.4-55, first paragraph, fourth sentence: "Where the projected rate would exceed the baseline rate, the impact would be significant; if the projected rate is below the baseline rate, the impact would be considered less than significant." 25
Comment: Although it was unlikely the intention, this sentence gives the impression that the existing baseline fatality rates are below the level of significance. There are also several other places in the PEIR that define significance as being greater than the baseline fatality rates. Actually, by any interruption of the existing fatality data, the level of non-significance has not been reached in any of the eight years of monitoring. The original goal of a 50% reduction in fatalities has not been reached and even if it were, that level of mortality may still be considered significant by many biologists. Perhaps a clarification of this in the text would be appropriate.

Perhaps this is detailed elsewhere in the PIER, but a clearly defined "baseline" fatality rate must be established. The PIER talks about violating the baseline and the consequences of doing so. However, a thorough development of how the baseline is established, the metric used (fatalities per turbine or per MW), and correction factors or other changes to the baseline permissible based on future information on causes of fatalities. The metric is critical as well as the variability around the value (e.g., variance) that will lead to the determination of violating (exceeding) the baseline.

Impacts and Mitigation Measures

Page 3.4-57 BIO-1b: Insufficient details on how direct and indirect disturbance (and take) of animal species (including those protected by MBTA) will be avoided. For example, seasonal limitations during breeding seasons? 26

Page 3.4-58: It would be useful to present data, such as table 3.4-10, for some other species besides raptors. In that same vein, is there a need to assess bird mortality at different distances from the new repowered turbines (both from studies, and as part of monitoring)? Further assessing effects should encompass examining before, during and after putting in new turbines. A biological monitoring person should be available during all these phases to asses potential injury, and to suggest ways to mitigate or reduce such effects. 27

Page 3.4-59 BIO-1e: Mentions a biological monitor present during all construction activities, but vague on intensity of survey work (says "periodic"); this needs to be specific such as initial (prior to an activity) and follow up (e.g., weekly) surveys. Here and elsewhere discusses "sensitive species" but does not elaborate on what these include; again need to reference MBTA. 28

Page 3.4.62: Special attention needs to be devoted to invasive plants because of the high potential for seed dispersal during construction and routine monitoring. 29

8

LA-2—Alameda County APWRA Scientific Review Committee

P289 - v.6 7-16-14

Monitoring for invasive plants needs to be conducted on a regular basis as part of the monitoring scheme. 29 cont.

Page 3.4-63 BIO-3a: Addresses field surveys for the habitat of all species status <3 years prior to activities. This is a very weak requirement unless followed by appropriate field surveys for the presence of the species closer to the time of construction. This is because "habitat" is difficult to quantify with accuracy unless the species of interest are determined to be present or absent. It is appropriate for an initial evaluation of potential species presence. 30

Page 3.4-64, Mitigation Measure BIO-1bc: Documenting special status species is an on-going activity, and special care should be given to designing the protocol to include all yearly and seasonal variation. 31

Page 3.4-66: Again, with changing climate, it is critical to continue to monitor and develop best management practices to avoid impacts to special status animals, as both physical and biological conditions will change, as well as bird populations within the APWRA. 32

Page 3.4-74: Special care should be mandated for reclaiming roads, as this restoration project has the potential to greatly introduce invasive species. Such projects should be timed to avoid sensitive breeding/migration times for herps and birds. 33

Page 3.4-85 BIO-8a: The distance from construction activities will not avoid disturbance to nesting raptors (500 feet) or other birds (50 feet) based on buffers used elsewhere by various agencies. For example, the USFWS has used 300 feet for some endangered songbirds, and uses a much farther distance (e.g., 1 mile or more) for raptors. 34

Overall comment: the document does not review or justify the distances proposed for exclusion zones and buffers. The literature, including agency reports and standards, need to be cited as justification for all proposed guidance

Page 3.4-85: It should be noted that the Migratory Bird Act protects all migratory species, not just the list or special concern species. Sufficient monitoring before construction is essential to identify sensitive times for migrant species. 35

Page 3.4-86: While some tree removal is essential, the concept of just removing them when birds are not present may not sufficient if some birds DEPEND upon these habitat features for nesting, particularly for sensitive species. 36

Page 3.4-86 BIO-8b: Discusses re-locating non-breeding BUOW but nothing about constructing new burrows; where will birds be relocated? Also, what about destroying burrows in non-breeding season that would have been used in breeding? 37

Page 3.4-88-9: It is essential to have a reasonable "breeding season" time period so that it includes territory establishment and the post-fledging period for sensitive species. 38

9

LA-2—Alameda County APWRA Scientific Review Committee

P289 - v.6 7-16-14

Page 3.4-89 BIO-9: Calls for mitigation for loss of owl breeding habitat but does not specify the type of mitigation site. For example, preserving already occupied but not permanently protected areas; or relocating owls to currently unoccupied areas? Also, no discussion of mitigation ratios (i.e., 2:1; 3:1?) and follow on monitoring. 39

Page 3.4-98, Impact BIO-11a-1: This section, consistent with the description in the Existing Conditions section focuses primarily on 8 species. Given the long list of birds that have been subject to collision-related mortality, it makes sense to focus on a representative sample. However, in doing so, the reader may not be fully informed about the extent of mortality that has occurred. Including the focal species used by the ongoing monitoring effort makes sense, but its not clear that the other species are the most representative. It is suggested that this sample be reevaluated to select those that are most representative of the issue and not rely on species' legal or conservation status as a primary factor. Also more fully describe (relative abundance and fatality rates) the birds that are lumped under 'all native non-raptors'. 40

Page 3.4-100, Impact BIO-11a-1: Although a minor point, it is unlikely that managing rock piles and some perches will reduce prey for kestrels (which forage largely on insects and lizards). 41

Page 3.4-100: The wide range in predicted kills for burrowing owls further indicates the need for a very rigorous monitoring program and carefully evaluation of analytical methods and results by the TAC. 42

Page 3.4-101: The G. Hunt research is now approaching 10 years (or more) old and, while relevant to cite, cannot be sued to represent the current status of the eagle population. 43

Page 3.4-103: The 'decreasing" trends in red-tail fatalities claimed is not supported by the actual data; needs re-evaluation. 44

Page 3.4-104: **Mitigation Measure BIO-11a: Prepare a project-specific avian protection plan** 45

Page 3.4-104: The components and utility of an APP should be more fully described.

Page 3.4-104: Design of a project specific avian plan is a great idea, but the composition of any group that does this should have some specificity with respect to qualification.

Page 3.4-104: No plan to remove hazardous turbines or seasonal shutdown thereof? 46

Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds 47

10

LA-2—Alameda County APWRA Scientific Review Committee

P289 - v.6 7-16-14

Page 3.4-104: Micro-siting of turbines - using analyses of landscape features and location-species bird use and behavior data to identify locations with reduced collision risk—may result in reduced fatalities (Smallwood et al. 2009). All project proponents will use the best information available to site turbines to reduce avian collision risk: avian use of the area; topographic features known to increase collision risk (trees, riparian areas, water bodies, and wetlands); and the latest models of collision risk." 47 cont.
Comment: It would be useful to cite the SRC's siting guidelines.
Alameda County SRC (Smallwood, K. S., S. Orloff, J. Estep, J. Burger, and J. Yee). 2010. Guidelines for siting wind turbines recommended for relocation to minimize potential collision-related mortality of four focal raptor species in the Altamont Pass Wind Resource Area. Alameda County SRC document P-70.

For the average reader, this measure may not provide sufficient information or assurances that siting will actually achieve anything. While each turbine should be sited independently according to its particularly surroundings, there is guidance that provides specific measures that have fairly universal application. For example, the SRC guidance document includes measures regarding avoidance of steep slopes, saddles, and other topographic features. Perhaps this measure can provide more specific guidance.

Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts 48

Page 3.4-104: This measure really doesn't constitute 'mitigation'. These turbine design features are already incorporated into new generation turbines and wind energy facilities.

Page 3.4-104: Retrofitting existing power lines and such should take into consideration any birds that traditionally get caught in them. 49

Page 3.4-104: The Curry and Kerlinger (2009) report used to support the blade height standard was conducted in Solano County and, while relevant to cite, does not present a complete evaluation of available data and literature. 50

Page 3.4-105, Mitigation Measure BIO-11d: This measures reads more like a project description than a mitigation measure. These things are also already universally applied to wind facilities in California. 51

Page 3.4-105 BIO-11f: The prohibition of rodenticides is a positive requirement to protect raptors and other predators. However, allowing rock piles in close proximity (200 yards) of turbines does not adequately minimize the raptor-turbine risk. Rocks (as defined in the document) should be removed farther (~500 m) from turbines to eliminate any concentration of potential prey near turbines. 52

Mitigation Measure Bio-11g: Implement post-construction avian fatality monitoring for all repowering projects ***[includes TAC]*** 53

11

LA-2—Alameda County APWRA Scientific Review Committee

P289 - v.6 7-16-14

Page 3.4-106: Include conservation organizations and natural resource trustees in a way that ensures participation. In many cases, such people are overworked, underpaid, and have little time. So their input is harder to get than that of companies (whose personnel are paid to attend such meetings). The state wildlife people should be involved, as should independent scientists (those not working for regulatory agencies, companies, or state government. The voluntary nature may preclude some people that are necessary to the process. Further, there should be some independent scientists involved – people who have no stake in the outcome or do not have agency directives. 53 cont.

Need to define timely with respect to monitoring reports. Such reports must be available in time to make reasonable decisions. Without timely reports, it is impossible to have adaptive management or respond quickly enough.

Consider adding a section on conservation measures for species other than raptors. We may someday find ourselves with a need to protect some specific group (e.g. Neotropical migrants or such), and need to have considered options. Without monitoring information on non-raptor species, it is difficult to develop conservation strategies.

Page 3.4-106: The key for the TAC to be successful is for the County to retain several (one is insufficient) scientists who are experienced in wildlife ecology, study design, and the wind industry. As stated the TAC is not a "decision making" body; hence it is critical that the County receive consistent and independent advice. Input from agency, NGO, and industry TAC members is important, but specific individuals will certainly change over even short periods of time. 54

Mitigation Measure BIO-11h: Compensation for the loss of raptors, including Golden Eagles, by contributing to conservation efforts 55

Page 3.4-107: need specific requirements for review and approval of actual fatality surveys, planned analyses, etc.

Page 3.4-107: What is the rationale for limiting this mitigation measure that addresses conservation efforts to raptors? 56

Conservation Measures

Page 3.4-108, Conservation Measures, second paragraph: How does the Raptor Mitigation Plan differ from the Avian Protection Plan required under BIO-11a? 57

Page 3.4-110 BIO-11i: Adaptive management plan—is very good that thresholds and triggers are mentioned. However, the proposed actions have little or no literature support as being effective, including painting blades and removing perching options (perching options were already removed from the new turbines). Using money for research ($2K/death) is not mitigation, and will be unlikely to build up to a useful amount. 58

12

LA-2—Alameda County APWRA Scientific Review Committee

Threshold 3—starts to get to likely effective actions but only ADMM-4 could be effective short of actual turbine removal. 59

Page 3.4-112 ADMM-6: Real-Time Turbine Curtailment: "If the above measures prove ineffective, then the project proponent will employ a real-time turbine curtailment program designed in conjunction with the TAC. The intent is to deploy a biologist to monitor onsite conditions and issue a curtailment order when raptors are near operating turbines." 60
Comment: This seems like it would be impossible to implement. First of all you would really need several biologists not just one to cover the entire area. Second, by the time the raptor is observed in close proximity to an operating turbine, operators notified, and then turbines shut down, the raptor would likely be gone.
It may be more beneficial to examine the prey base around the more hazardous turbines and implement a prey reduction program around the offending turbines.

Page 3.4-113: Again, it would be useful to add some non-raptors to the table, especially those that have high collision rates. 61

Page 3.4-127 BIO-14b: Suggestions to restrict bat fatality surveys to roads and pads is unacceptable unless it is first indexed against a proper (all ground cover) surveys. Additionally, the acoustic sampling guidelines referenced are now >8 years old and need to be revised to match current technology. 62

Page 3.4-129 BIO-14d: While it is difficult to know the proper actions for bat fatalities, the document should default to those known to be effective (and logical) for birds such as seasonal shutdown of known hazardous turbines. 63

Page 3.4-130, ADMM-7: Seasonal Turbine Cut-in Speed Increase, first paragraph. There are conclusive data to support the reduction in mortality from an increase in cut-in speeds. There are now several studies that have been completed that clearly indicate this relationship. While increasing cut-in speed from the typical 3.5m/s to 5.0m/s will reduce power generation, this reduction and the associated economic impact has been shown to be fairly minimal. 64

First bullet: Studies have shown that increasing cut-in speed above 5.0 m/s is ineffective. If substantial mortality continues following the increase to 5.0, then experimentation with other cut-in speeds is warranted. But the document should more fully describe what is already known about the effect of increasing cut-in speed.

Chapter 4 - Alternatives Analysis

Why is the no project alternative this: ***No Repowering, Reauthorization of Existing CUPs***, and not this: ***No Repowering—Full Decommissioning***? Would the status quo be that the current turbines will be decommissioned if not repowered? 65

LA-2—Alameda County APWRA Scientific Review Committee

P289 - v.6 7-16-14

Page 4-18, 4.1.6: If repowering is an integral program objective, then how is it that the first two alternatives, which specifically state no repowering, are not automatically eliminated on Page 4-18 in the section (4.1.6) to eliminate alternatives that do not meet the program objectives? 66

Other Comments

Legal issues: Needs a discussion of how federal agencies, especially USFWS, could deal with violation of MBTA. MBTA will be technically violated because songbirds will be directly killed, and nests will be destroyed unless specific steps are taken to avoid. 67

14

E.4.2 Comment Letter LA-2—Alameda County APWRA Scientific Review Committee

Response to Comment LA-2-1

Please see Master Response 1, *Baseline and Determination of Significance*, for a detailed discussion of the rationale for the baseline and significance criteria. Please see Master Response 3, *Avian Mortality Rates Methodology for Existing Conditions,* for a discussion of the selection of data to establish baseline fatality rates.

Response to Comment LA-2-2

The commenter states that the selection of species for the avian impact analysis is not clear in the Draft PEIR. Please see Master Response 7, *Migratory Bird Treaty Act*, for a discussion of the selection and presentation of species in the impact analysis. The commenter also states that the coverage of the MBTA and other laws and regulations should be noted. A discussion of the regulatory setting, including the MBTA and other laws and regulations pertaining to biological resources, appears on pages 3.4-1 through 3.4-7 of the Draft PEIR.

Response to Comment LA-2-3

This comment is a part of a summary of SRC's comments. Please see responses to individual comments provided by this commenter below.

Response to Comment LA-2-4

The commenter suggests that participation of independent scientists and nongovernmental organizations is highly recommended for the TAC. Please see Master Response 6, *Technical Advisory Committee*, regarding the TAC.

Response to Comment LA-2-5

The commenter correctly questions why the program objectives presented in Chapters 2 and 4 of the Draft PEIR differ slightly. This is an editorial error. The text in Section 4.1.2, *Project Objectives*, on pages 4-2 and 4-3 of the Draft PEIR has been revised as shown below.

> As described in Chapter 2, *Program Description*, the two primary objectives of the program are to facilitate efficient wind energy production through repowering ~~the replacement of existing wind energy turbines with more efficient turbines, increase energy production,~~ and to avoid and minimize impacts on terrestrial and avian wildlife caused by repowered wind turbine construction, operation, and maintenance in the program area. The specific program objectives are listed below.
>
> - Allow for appropriate and compatible repowering and operation of wind turbines consistent with existing repowering timeline requirements set forth in the existing CUPs, related agreements, and project-specific power purchase agreements~~2005 CUPs and applicable laws~~.
> - Reduce avian mortality caused by wind energy generation in the program area through repowering.
> - Meet the County's goals to provide environmentally sensitive, clean-renewable wind energy for the twenty-first century as identified in the ECAP (Policies 168–175 and Programs 73–76)~~*East County Area Plan* (Policies 168 through 175 and Programs 73 through 76)~~.

- Help meet the Governor's Executive Order S-14-08 in meeting the Renewables Portfolio Standard (RPS) target that all retail sellers of electricity serve 33% of their load with renewable energy by 2020.
- Contribute to state progress toward air quality improvement and greenhouse gas emission reduction goals, as set forth in Assembly Bill 32.
- Improve habitat quality in the program area through removal of roads and existing wind turbines and their supporting infrastructure, resulting in lower overall operational footprint, and providing a wide range of habitat benefits to sensitive terrestrial and avian species.

Response to Comment LA-2-6

The APWRA footprint is compared to the proposed program area boundary in Figure 1-2 of the Draft PEIR. Please also see Master Response 2, *Program Area Boundary*.

Response to Comment LA-2-7

The commenter states that it would be useful to see the program-level APP in its entirety in order to make a full evaluation of the Draft PEIR. Please see Master Response 8, *Avian Protection Plan*, regarding the APP.

Response to Comment LA-2-8

The commenter requests that additional detail be included in the description of natural communities in *Environmental Setting*, beginning on page 3.4-7 of the Draft PEIR. Specifically, the commenter requests that landscape features associated with the natural communities be discussed, noting how these features affect bird use and the potential risk of turbine-related mortality. While the request for greater scientific rigor is appreciated, the County feels that the comprehensive suite of mitigation measures and the adaptive management strategy adequately consider the local variations than can arise as individual projects are conceived, designed, and subjected to environmental review. Specifically, Mitigation Measure BIO-11b on page 3.4-104 of the Draft PEIR specifies considerations to be taken account during siting of turbines.

Response to Comment LA-2-9

The commenter correctly points to confusion regarding the inclusion of non-special-status species with special-status species in the species-specific discussions in *Special-Status Wildlife* beginning on page 3.4-24 of the Draft PEIR, as well as the addition of four focal species. The definition of *Special-Status Species* on pages 3.4-20 and 3.4-21 has been broadened to include "APWRA Focal Species" and "Species of Local Conservation Concern in the APWRA" as shown in Response to Comment LA-1-39. The latter category comprises the four species that have been added to the species-specific discussions in the analysis.

Response to Comment LA-2-10

The commenter notes that the discussion of avian mortality and monitoring includes an incorrect characterization of the mortality reductions from two primary management actions. In response to this comment, the County has changed "predicted" to "expected" in the second paragraph of *Avian Mortality and Monitoring* on page 3.4-45 of the Draft PEIR. The revised text is shown in Response to Comment FA-1-9.

Response to Comment LA-2-11

The commenter suggests that the discussion of avian fatalities be expanded to include all species of birds that have been taken by windfarm operations in the APWRA. As stated in Response to Comment LA-1-47, all bird species are included in the analysis; however, they are summarized into raptor and non-raptor categories, rather than addressed as individual species. Please see Response to Comment FA-1-11 for more information.

Response to Comment LA-2-12

For a response to this comment, please see Master Response 11, *Bat Impacts and Mitigation*.

Response to Comment LA-2-13

The commenter states that Table 3.4-6 on page 3.4-47 of the Draft PEIR is unclear and suggests changes. The commenter's assertion is that the purpose of the table is to compare the number of MWs to the number of turbines and that additional changes to the table are necessary to make that purpose clear. As described in the fourth paragraph of the *Bat Fatality and Monitoring* section on page 3.4-46 of the Draft PEIR, the purpose of the table is simply to list the species of bats that have been recorded as fatalities at various project sites, not to compare sites or assess impacts following repowering. The County believes the table accomplishes this purpose. No change is required.

Response to Comment LA-2-14

Please see Responses to Comments LA-1-50 and LA-2-18 for a response to this comment.

Response to Comment LA-2-15

The commenter provides notes regarding the calculation of the baseline fatality estimates in the Draft PEIR and suggests a change to the calculation. Please see Master Response 3, *Avian Mortality Rates Methodology for Existing Conditions*, regarding this comment.

Response to Comment LA-2-16

The commenter states that the selection of species for the avian impact analysis is not clear in the Draft PEIR. Please see Master Response 7, *Migratory Bird Treaty Act*, for a discussion of the selection and presentation of species in the impact analysis.

Response to Comment LA-2-17

The commenter points out that 95% confidence intervals are not included in Table 3.4-10 as stated in the seventh paragraph of *Avian Fatality Analysis Methods* on page 3.4-52 of the Draft PEIR. The County notes that presenting the confidence intervals is not significant to the analysis of potential impacts. The paragraph has been revised as shown below.

> ICF biologists compared the baseline number of fatalities for each species and species group calculated as outlined above to the number of fatalities expected to occur as a result of repowering. The number of fatalities expected to occur as a result of repowering was based on the 417 and 450 MW caps for the two program alternatives and on the size of each of the projects measured in MWs as outlined in the project description. The rates used to calculate the number of fatalities expected to occur as a result of repowering were derived from the rates at three repowering projects in the

APWRA that use newer, repowered turbines: Diablo Winds, Buena Vista, and Vasco Winds. Diablo Winds comprises thirty-one 660 kW turbines, Buena Vista thirty-eight 1 MW turbines, and Vasco Winds thirty-four 2.3 MW turbines (Insignia Environmental 2012; Brown et al. 2013; ICF International 2013). Although there is considerable range in turbine sizes among these three projects, they are all considered new-generation turbines relative to the rest of the turbines installed in the APWRA. The annual fatality rates (expressed as fatalities per MW per year) for these three repowering projects are presented in Table 3.4-10 ~~(with 95% confidence intervals where available)~~, along with the average of the annual fatality rates at nonrepowered turbines for comparison. However, it should be noted that the rate estimates available from new-generation repowered turbines in the APWRA may not be representative of rates that would occur at other locations in the APWRA. This is because the three existing repowered project sites each have different turbine types and are located in three relatively small, distinct areas with site-specific geographic, topographic, and other ecological conditions, and because the primary species of concern are not evenly distributed throughout the APWRA.

Response to Comment LA-2-18

The commenter notes that the Draft PEIR suggests returning to fatalities per turbine rather than per MW, but then presents data as fatalities per MW. The commenter also suggests that clarification is needed regarding the metric(s) to be used following repowering. Pages 3.4-51 through 3.4-54 of the Draft PEIR describe the avian fatality analysis methods used in the PEIR to assess impacts of repowering. The discussion is not meant to apply to the metrics used to assess the results of future repowering projects. The Draft PEIR describes the different metrics that can be used to assess impacts, but concludes that for this analysis, a per-MW basis is the most appropriate because of the wide variations in turbine types between old- and new-generation turbines. Additionally, the County believes it may be appropriate to consider the impacts of repowered projects on a per-turbine and/or per-MW basis. As described in Mitigation Measure BIO-11g beginning on page 3.4-106 of the Draft PEIR, monitoring and reporting on future repowering projects is required. A TAC, made up of resource agency representatives and other experts, will review proposed monitoring protocols and reports and may suggest the appropriate metrics to use at that time; the TAC could recommend using estimates on a per-MW and/or a per-turbine basis.

Please see also Response to Comment LA-1-50.

Response to Comment LA-2-19

The commenter states that the PEIR should review and discuss any fatality data from other WRAs with new generation turbines and fatality rates. The County believes that the APWRA is unique and that attempting to compare it with other WRAs for the purpose of estimating impacts would be inappropriate. Doing so would not meaningfully inform the ultimate estimate of impacts that is required in the PEIR.

Response to Comment LA-2-20

The commenter suggests using a QA/QC approach to detection probabilities for future monitoring of repowered turbines. The County appreciates that suggestion and notes that Mitigation Measure BIO-11g beginning on page 3.4-106 of the Draft PEIR requires a TAC, made up of resource agency representatives and, potentially, other experts. The TAC will review proposed monitoring protocols and reports and may suggest the appropriate analysis methods to use, based on the best available and most accepted methods at that time.

Response to Comment LA-2-21

The commenter references the description of potential biases in the Draft PEIR, noting that an integrated detection probability study design, conducted concurrently with monitoring, would be preferable. The County believes that the commenter is suggesting a study design that would apply to future monitoring efforts after repowering. As noted in Response to Comment LA-2-20, a TAC will review proposed monitoring protocols and may suggest the appropriate analysis methods to use, based on the best available and most accepted methods at that time.

Response to Comment LA-2-22

The commenter notes that an additional potential bias in the analysis methods, search radius, should be mentioned. The County appreciates the comment and has added the following text after the third paragraph of *Potential Biases in the Avian Fatality Analysis Methods* on page 3.4-54 of the Draft PEIR.

> Differences in search radius may constitute an additional bias affecting the analysis. There is some debate in the scientific community regarding the appropriate search radii; consequently, fatality rates for new-generation turbines may have a potential and as yet unknown bias.

Response to Comment LA-2-23

For a response to this comment, please see Master Response 11, *Bat Impacts and Mitigation*.

Response to Comment LA-2-24

The commenter discusses areas to be considered in determination of the baseline and threshold for determining significance of impacts on avian species. Please see Master Response 1, *Baseline and Determination of Significance*, for a response to this comment.

Response to Comment LA-2-25

The commenter provides further comments regarding the clarity of the baseline and threshold for determining significance of impacts on avian species. The County appreciates the comment. Please see Master Response 1, *Baseline and Determination of Significance*.

Response to Comment LA-2-26

The commenter requests greater detail on how direct and indirect disturbance of animal species will be avoided. Mitigation Measure BIO-1b provides general protective measures that apply to all special-status species. Impacts BIO-1a-1, BIO-1a-2, BIO-1b, and BIO-1c specify impacts on special-status plant species, and while Mitigation Measure BIO-1b was initially crafted to address such impacts, it was kept general enough to afford protection to a wide range of wildlife species as well. Additional mitigation measures for individual species or groups of species provide detail on how direct and indirect effects would be minimized or avoided, including seasonal limitations. No revisions to the PEIR are necessary.

Response to Comment LA-2-27

The commenter suggests that it would be useful to present data on page 3.4-58, such as in Table 3.4-10, for some other species beside raptors. Page 3.4-58 of the Draft PEIR addresses mitigation measures for potential impacts on special-status plants; however, it appears that the commenter intended to reference page 3.4-53, on which the table actually appears.

The commenter also poses a question regarding the need to assess bird mortality at different distances from the new repowered turbines; notes that further assessing effects should encompass examining before, during, and after putting in new turbines; and notes that a biological monitoring person should be available during all phases to assess potential injury and to suggest ways to mitigate or reduce such effects. The bird mortality monitoring described in Mitigation Measure BIO-11g on page 3.4-106 of the Draft PEIR would require project monitoring according to currently accepted protocols, as reviewed by the TAC; such protocols would include monitoring out to specified distances from turbines. Additionally, the mitigation measure requires the preparation of annual monitoring reports, which are also reviewed by the TAC. Lastly, Mitigation Measure BIO-11i requires implementation of adaptive management measures to be guided by the TAC if the impacts following repowering are not as expected.

Response to Comment LA-2-28

The commenter requests additional detail regarding biological monitoring requirements. Preconstruction surveys (what the commenter refers to as initial surveys) are discussed for each species or group of species potentially affected. The commenter refers to "sensitive species" and states that this needs to be defined; however, the terminology used in Mitigation Measure BIO-1e is "sensitive biological resources" and gives special-status species, sensitive vegetation communities, and wetlands as examples of these resources. For clarification, the text of Mitigation Measure BIO-1e on page 3.4-59 of the Draft PEIR has been revised as shown below.

> All project proponents will retain a qualified biologist (as determined by Alameda County) to conduct periodic monitoring of decommissioning, repowering, and reclamation activities that occur adjacent to sensitive biological resources (e.g., special-status species, sensitive vegetation communities, wetlands). <u>Monitoring will occur during initial ground disturbance where sensitive biological resources are present and weekly thereafter or as determined by the County in coordination with a qualified biologist.</u> 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 project proponent or its contractors maintain exclusion areas adjacent to sensitive biological resources, and for documenting compliance with all biological resources– related mitigation measures.

Response to Comment LA-2-29

The commenter states that special attention should be devoted to invasive plants, including monitoring on a regular basis as part of the monitoring scheme. The County notes that Mitigation Measure BIO-2 on page 3.4-61 of the Draft PEIR includes measures to avoid and minimize the introduction of invasive nonnative plants. The mitigation measure requires monitoring, with the schedule to be determined on the basis of site-specific conditions, as well as preparation of a Grassland Restoration plan in consultation with the County and CDFW as specified in Mitigation Measure BIO-5c on page 3.4-74 of the Draft PEIR. The County believes that the Draft PEIR specifies appropriate monitoring as pointed out by the commenter.

Response to Comment LA-2-30

The commenter points out that field surveys within 3 years prior to activities is an inadequate requirement. Mitigation Measure BIO-3a requires an initial habitat survey by a qualified biologist to identify habitat for special-status species and other sensitive habitats. This measure would not be implemented independently, but in concert with many additional measures specific to each special-status species or group of species that would be implemented after suitable habitat is identified under Mitigation Measure BIO-3a. Many of these measures require species-specific surveys. As noted by the commenter, this measure is appropriate for the initial evaluation of potential species presence, which is all that it was intended to be. No revisions to the PEIR are necessary.

Response to Comment LA-2-31

The commenter notes that care should be given to designing protocols to include all yearly and seasonal variation. The County assumes that the commenter is referring to Mitigation Measure BIO-3a on the referenced page because of the reference to special-status species survey protocols. The mitigation measures refer to agency survey protocols when available and strive to use the best available scientific information for special-status species surveys. This measure applies to impacts from project construction, which will be of relatively short duration compared to the impacts from project operation. Surveys to determine year-round and seasonal variation may not be necessary for a short-term construction project. No revisions to the PEIR are necessary.

Response to Comment LA-2-32

The commenter emphasizes the importance of considering climate change in evaluating impacts. The mitigation measures in this portion of the document are primarily intended to avoid and minimize the potential impacts of construction activities on special-status species and other biological resources. Because these activities are of relatively short duration, long-term monitoring to assess the effects of climate change is not warranted. Long-term monitoring of birds and bats during the operation of the project would be conducted through mitigation measures that are discussed in the PEIR. No revisions to the PEIR are necessary.

Response to Comment LA-2-33

The commenter emphasizes the need for care during reclamation of roads. Mitigation Measure BIO-2 contains measures to avoid and minimize the introduction and spread of invasive plants during repowering activities, and Mitigation Measure BIO-5c requires that a Restoration Plan be developed in coordination with CDFW to ensure that reclaimed roads are restored with noninvasive species and monitored for success. Mitigation Measure BIO-5a contains several elements that protect amphibians: limiting ground-disturbing activities to dry weather between April 15 and October 31, not conducting ground-disturbing work during wet weather, ending all project activity 30 minutes before sunset and not resuming until 30 minutes after sunrise during the migration season from November 1 through June 15, and imposing reduced speed limits. Mitigation Measures BIO-7a, BIO-8a, and BIO-8b were developed to minimize and avoid potential impacts on reptiles and birds, including avoiding the removal of suitable nesting substrate for birds during the nesting season. No revisions to the Draft PEIR are necessary.

Response to Comment LA-2-34

Regarding the adequacy of no-disturbance buffers to avoid disturbances of nesting birds, please see Response to Comment FA-1-13.

Response to Comment LA-2-35

The commenter points out that the MBTA protects all migratory species, not just special-status species. The title of this impact is *Potential construction-related disturbance or mortality of special-status and non–special-status migratory birds*. The text of this specifies that "Construction activities during the nesting season (generally February 1–August 31) of white-tailed kite, bald eagle… could result in direct effects on these species, as well as on non–special-status migratory birds, if they are nesting in the program area." Hence, all migratory birds are addressed in the impact, not just special-status birds. It is generally accepted that the most sensitive time for birds is the breeding season, and all measures for birds set forth in the PEIR have provisions to avoid or minimize impacts during the breeding season. Please see also Response to Comment LA-2-30. No revisions to the PEIR are necessary.

Response to Comment LA-2-36

The commenter points out that simply limiting tree removal to the nonbreeding season may be an insufficient avoidance and minimization measure. Because the placement of wind turbines would generally be on the tops of hills and ridgelines in the program area where trees are not generally present, the number of trees to be removed is expected to be very low. In general, a bird that used a tree for nesting that was removed would nest in a different tree when it returns the following year to nest. Tree removal may indeed be an impact for certain special-status species, but given the low likelihood that trees will need to be removed, the County has determined that the mitigation is adequate as written. Nevertheless, the text of Impact BIO-8a-1 and its variants (BIO-8a-1, BIO-8a-2, BIO-8b, and BIO-8c) has been revised for clarification as shown below.

> Construction activities during the nesting season (generally February 1–August 31) of white-tailed kite, bald eagle, northern harrier, Swainson's hawk, golden eagle, western burrowing owl, loggerhead shrike, and tricolored blackbird could result in direct effects on these species, as well as on non–special-status migratory birds, if they are nesting in the program area. Suitable nesting habitat may be present in nearly all land cover types in the program area. Removal of grassland, burrows, wetland and marsh vegetation, and trees or shrubs with active nests and construction disturbance during the breeding season may result in nest abandonment and subsequent loss of eggs or young. <u>Because the placement of wind turbines would generally be on the tops of hills and ridgelines in the program area where trees are not generally present, the number of trees to be removed is expected to be very low. Exclusion of burrowing owls from their burrows during the non-nesting season as part of efforts to avoid or minimize some forms of direct take could result in harm of burrowing owls.</u> Estimated permanent and temporary impacts on suitable foraging habitat (grassland, cropland, alkali meadow and scald, and wetlands) for special-status and non–special-status birds are shown in Table 3.4-7. Such losses could affect the local population of special-status and non– special-status birds. This would be a significant impact. Implementation of Mitigation Measures BIO- 1b, BIO-1e, BIO-3, BIO-5c, BIO-8a, and BIO-8b would reduce this impact to a less-than-significant level.

Response to Comment LA-2-37

The Commenter expresses concerns regarding impacts on burrowing owl and some mitigation activities to address these impacts. "Passive relocation" is a somewhat confusing term that CDFW has used. Essentially, a burrowing owl could be excluded from its burrow during the non-nesting season through installation of one-way doors. The owl would not be physically relocated but would be forced to find another burrow on its own. The County would ensure that burrowing owls would only be excluded from their burrows as a last resort and would work with a qualified biologist and CDFW to monitor the exclusion process and provide mitigation for the loss of the occupied burrow (see Mitigation Measure BIO-9). It is unclear if the commenter's question regarding destruction of burrows refers to occupied or unoccupied burrows. As stated, if burrows occupied during the nonbreeding season are removed, compensation would be provided through Mitigation Measure BIO-9. CDFW does not require compensation for the removal of unoccupied burrows. The sixth bullet of Mitigation Measure BIO-8b in the Draft PEIR has been revised as shown below to clarify the terminology related to excluding owls from their burrows.

- If burrowing owls are present in the direct disturbance area and cannot be avoided during the non-breeding season (generally September 1 through January 31), burrowing owls may be excluded from burrows through the installation of~~passive relocation techniques (e.g., installing~~ one-way doors at burrow entrances. A burrowing owl exclusion plan, prepared by the project proponent, must be approved by CDFW prior to exclusion of owls. ~~) may be used. Passive relocation will be accomplished by installing one~~One-way doors (e.g., modified dryer vents or other CDFW-approved method)~~, which~~ will be left in place for a minimum of 1 week and monitored daily to ensure that the owl(s) have left the burrow(s). Excavation of the burrow will be conducted using hand tools. During excavation of the burrow, a section of flexible plastic pipe (at least 3 inches in diameter) will be inserted into the burrow tunnel to maintain an escape route for any animals that may be inside the burrow. Owls will be excluded from their burrows as a last resort and only if other avoidance and minimization measures cannot be implemented.

Response to Comment LA-2-38

The commenter requests a "reasonable 'breeding season' time period" that includes territory establishment and the post-fledging period. It is assumed that the commenter is referring to the breeding season of February 1 through August 31 referred to in Mitigation Measure BIO-8a. The period of February 1 through August 31 is the timeframe that CDFW most commonly uses in its streambed alteration agreements when referring to the breeding season. However, some birds begin breeding activities in January and some young do not fledge until September or October. The timeframe of February 1 through August 31 covers the breeding season of the majority of birds expected to occur in the program area. Additionally, this is a general timeframe, and avoidance and minimization measures would continue for any species nesting in or near the project area beyond August 31. No revisions to the PEIR are necessary.

Response to Comment LA-2-39

The commenter requests clarification regarding mitigation for loss of burrowing owl habitat. Mitigation Measure BIO-9 refers to CDFW's *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012:11–13) for the details of mitigating the loss of occupied burrowing owl habitat. This report provides substantial guidance on where mitigation can occur and the maintenance and management of the site. The 2012 Staff Report does not recommend mitigation ratios for habitat compensation but rather recommends that they be "sufficiently large" and that CDFW should be consulted regarding "determining offsite mitigation acreages." Again, owls would not be relocated, but would be excluded from burrows as a last resort. Please see also Response to Comment LA-2-37).

Response to Comment LA-2-40

The commenter notes that the selection of species for the avian impact analysis is not clear in the Draft PEIR. Please see Master Response 7, *Migratory Bird Treaty Act*, for a discussion of the selection and presentation of species in the impact analysis. A discussion of the extent of past mortality, as suggested by the commenter, is not the purpose of the PEIR; the purpose of the PEIR is to assess the effects of future repowering projects. While a discussion of past mortality rates is necessary to describe baseline conditions, the purpose of the PEIR is not to authorize previous projects or reauthorize previous projects; consequently, the extent of past mortality, while significant, is not relevant to the PEIR.

Response to Comment LA-2-41

The commenter observes that managing rock piles and some perches may not reduce prey for kestrels. Regarding the suite of measures outlined under Mitigation Measures BIO-11c and BIO-11f, the County agrees that several of the measures may not reduce prey for American kestrel. However, in addition to the management of rock piles and reduction of perching opportunities described in these mitigation measures, which the County believes are beneficial for other species, the measures also describe several other impact reduction measures the County believes would be beneficial to American kestrel. Those measures include restrictions on the use of rodenticides to minimize secondary poisoning, as well as other turbine design characteristic requirements that would limit perching opportunities on or near turbines, thus avoiding perching behavior in dangerous locations. Moreover, these measures are not identified as reducing impacts to a less-than-significant level.

Response to Comment LA-2-42

The commenter notes that the wide range of predicted burrowing owl fatalities indicates the need for a very rigorous monitoring program, with careful evaluation of methods and results by the TAC. The County agrees with the commenter and believes that the framework of the TAC will facilitate the careful evaluation suggested by the commenter.

Response to Comment LA-2-43

The commenter notes that research used to describe golden eagle populations is nearly 10 years old and, while relevant to cite, cannot be used to reflect the current status of the eagle population. Please refer to Response to Comment FA-1-9 for the expanded species account for golden eagle.

Response to Comment LA-2-44

The commenter disagrees with a statement in the third paragraph of the discussion of *Red-Tailed Hawk* on page 3.4-103 of the Draft PEIR indicating that there has been a general decreasing trend in red-tailed hawk fatalities in the APWRA since 2005. The Draft PEIR statement is supported by information on page 3-6 of the most recent APWRA bird fatality study (ICF International 2014), which also states that the overall fatality rate trend is still downward for most species (including red-tailed hawks). For clarification, the text of the aforementioned paragraph on page 3.4-103 of the Draft PEIR has been revised as shown below.

> Although a substantial number of red-tailed hawk fatalities occur in the APWRA, the annual fatalities have shown a generally decreasing trend since 2005<u>, although not a statistically significant decline</u> (ICF International 2012)<u>,</u> and are predicted to continue to decline as repowering proceeds in the

APWRA (Smallwood 2010; ICF International 2012). The yearly fatalities for red-tailed hawks presented in Table 3.4.11 coincide with these other studies, suggesting that repowering the program area is likely to continue to reduce the number of red-tailed hawks killed each year. Considering that the red-tailed hawk population in California has grown while the APWRA has been in operation, continued operation of repowered turbines in the program area is unlikely to have any population-level impacts on red-tailed hawk.

Response to Comment LA-2-45

The commenter states that the components and utility of a project-specific APPs should be more fully described. Please see Master Response 8, *Avian Protection Plan*.

Response to Comment LA-2-46

The commenter asks whether there is a plan to remove hazardous turbines or to have seasonal shutdowns. Mitigation Measure BIO-11i, beginning on page 3.4-110 of the Draft PEIR, includes measures to curtail turbines should fatality thresholds be exceeded. Hazardous turbine removal is not proposed because of the significant ground disturbance and effort required to move a modern turbine, as well as other measures requiring careful siting such as Mitigation Measure BIO-11b on page 3.4-104 of the Draft PEIR. The County's intent is to achieve reductions in impacts through careful initial siting of turbines to avoid hazardous locations, as well as through shutdowns, if necessary.

Response to Comment LA-2-47

The commenter notes that it would useful to cite the SRC's siting guidelines in Mitigation Measure BIO-11b. The County appreciates the comment and has revised Mitigation Measure BIO-11b on page 3.4-104 of the Draft PEIR as shown in Response to Comment FA-1-14. In addition, the siting guidelines have been included in Appendix F, *Historical Documents*, of the Final PEIR.

Response to Comment LA-2-48

The commenter states that Mitigation Measure BIO-11c, which requires the use of turbine designs that reduce avian impacts, does not constitute mitigation because new generation turbines already use these designs. The County notes that Mitigation Measure BIO-11c is primarily intended as a programmatic measure for future repowering projects. While currently proposed wind turbines do meet the design specifications, it is possible that future repowering projects could be proposed using turbine designs that conflict with the specifications. Environmental analysis for such future repowering projects would be tiered from this PEIR; consequently, the County believes the measure is necessary to retain for that purpose.

Response to Comment LA-2-49

The commenter states that "retrofitting existing power lines and such should take into consideration any birds that traditionally get caught in them." The County believes the commenter is referring to Mitigation Measure BIO-11e on page 3.4-105 of the Draft PEIR, which requires repowered projects to retrofit existing infrastructure to minimize electrocution of raptors. Because raptors are the primary group of avian species that are typically subject to electrocutions from power lines, the County believes the measure already takes the type of species typically affected into consideration. No changes to the mitigation measure are required.

Response to Comment LA-2-50

The commenter indicates that the blade height design standard used in Mitigation Measure BIO-11c on page 3.4-104 of the Draft PEIR does not present a complete evaluation of available data and literature. The County appreciates the comment and has revised the mitigation measure as shown below to allow for more thorough review and consideration of turbine designs for future repowering projects.

Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts

Use of turbines with certain characteristics is believed to reduce the collision risk for avian species. Project proponents will implement the design-related measures listed below.

- <u>Turbine designs will be selected that have been shown or that are suspected to reduce avian fatalities, based on the height, color, configuration, or other features of the turbines.</u> ~~The distance of the lowest point of the turbine rotor (i.e., the tip of any blade at the 6:00 position), will be no less than 29 meters (95 feet) from the ground surface. This design characteristic addresses the finding that roughly 74% of all bird observations (54% of raptor observations) occurred at heights less than 30 meters (Curry and Kerlinger 2009).~~
- Turbine design will limit or eliminate perching opportunities. Designs will include a tubular tower with internal ladders; external catwalks, railings, or ladders will be prohibited.
- Turbine design will limit or eliminate nesting or roosting opportunities. Openings on turbines will be covered to prevent cavity-nesting species from nesting in the turbines.
- Lighting will be installed on the fewest number of turbines allowed by FAA regulations, and all pilot warning lights will fire synchronously. Turbine lighting will employ only red or dual red-and-white strobe, strobe-like, or flashing lights (U.S. Fish and Wildlife Service 2012a). All lighting on turbines will be operated at the minimum allowable intensity, flashing frequency, and quantity allowed by FAA (Gehring et al. 2009; U.S. Fish and Wildlife Service 2012a). Duration between flashes will be the longest allowable by the FAA.

Response to Comment LA-2-51

The commenter states that the requirements in Mitigation Measure BIO-11d on page 3.4-105 of the Draft PEIR are universally applied to wind facilities in California. Mitigation Measure BIO-11d provides requirements for project proponents to include project components and design features that minimize avian impacts. While the County believes that these measures are commonly used at wind facilities in California, including them as Mitigation Measures allows the County to include them in the MMRP to ensure that they are completed. Consequently, the County believes that they should remain as mitigation measures in the Final PEIR.

Response to Comment LA-2-52

The commenter requests that rock piles should be moved more than 500 meters from turbines to reduce the potential for prey to concentrate around turbines. The County agrees. Mitigation Measure BIO-11f on pages 3.4-105 and 3.4-106 of the Draft PEIR has been revised as shown in Response to Comment FA-1-18.

Response to Comment LA-2-53

The commenter makes suggestions regarding the makeup and organization of the TAC. Please see Master Response 6, *Technical Advisory Committee*, which outlines and clarifies the County's intentions for the TAC. The commenter also notes that the timeline for submission of monitoring reports should be outlined, and notes that the County should consider conservation measures for species other than raptors. Please see Master Response 5, *Avian Fatality Monitoring Methodology*, which provides additional details regarding the postconstruction fatality monitoring measure and includes a timeline for the submission of the required reports.

Although not specifically stated in the Draft PEIR, the County believes that the conservation measures for raptors outlined in Mitigation Measure BIO-11h, beginning on page 3.4-107 of the Draft PEIR, will also have benefits for all avian species. The text of this measure has been revised as shown in Master Response 9, *Avian Compensatory Mitigation*, to clarify the County's conservation approach.

Response to Comment LA-2-54

The commenter states its opinion that the TAC should retain several scientists who are experienced in wildlife ecology, study design, and the wind industry. Please see Master Response 6, *Technical Advisory Committee*, for revisions to the description of the TAC.

Response to Comment LA-2-55

The commenter states that specific requirements for the review and approval of fatality surveys, planned analyses, etc., are needed. The commenter references Mitigation Measure BIO-11h; however, Mitigation Measure BIO-11g beginning on page 3.4-106 of the Draft PEIR outlines fatality monitoring requirements. Please see Master Response 6, *Technical Advisory Committee*, and Master Response 5, *Avian Fatality Monitoring Methodology*, for increased detail regarding fatality monitoring requirements.

Response to Comment LA-2-56

The commenter requests additional rationale for limiting Mitigation Measure BIO-11h to raptors. As noted in response to comment LA-2-53, the County believes that the conservation measures for raptors outlined in Mitigation Measure BIO-11h, beginning on page 3.4-107 of the Draft PEIR, will have benefits for all avian species.

Response to Comment LA-2-57

The commenter questions how the Raptor Mitigation Plan differs from the Avian Protection Plan (APP). As noted in Response to Comment LA-2-53, Mitigation Measure BIO-11h has been revised to clarify that the raptor mitigation plan is to be included in the project-specific APP for each project.

Response to Comment LA-2-58

Please refer to Master Response 10, *Adaptive Management*, for a response to this comment.

Response to Comment LA-2-59

The commenter states that Threshold 3 in Mitigation Measure BIO-11i approaches effective actions but that only ADMM-4 could be effective short of turbine removal. The County appreciates the comment but notes that the thresholds and measures provided are part of an overall adaptive management plan. Inclusion of only one potential measure in an adaptive management plan, as suggested by the commenter, would not provide the County or the TAC with options to consider in the future. The commenter did not suggest any alternative measures to consider. No change to the mitigation measure is required.

Response to Comment LA-2-60

The commenter states that real-time turbine curtailment as described in Mitigation Measure BIO-11i (ADMM-6) may be impossible to implement. As stated in Response to Comments LA-1-72 and LA-1-73, the County agrees that implementation of this measure may be difficult using today's technology; however, technology may become available in the future to make the measure feasible. Please see Master Response 10, *Adaptive Management*, for revisions to Mitigation Measure BIO-11i.

Response to Comment LA-2-61

The commenter suggests that it would useful to include other individual species in Table 3.4-12 on page 3.4-113 of the Draft PEIR. Please see Master Response 7, *Migratory Bird Treaty Act*, for a discussion of the selection and presentation of species in the impact analysis.

Response to Comment LA-2-62

For a response to this comment, please see Master Response 11, *Bat Impacts and Mitigation*.

Response to Comment LA-2-63

For a response to this comment, please see Master Response 11, *Bat Impacts and Mitigation*.

Response to Comment LA-2-64

For a response to this comment, please see Master Response 11, *Bat Impacts and Mitigation*.

Response to Comment LA-2-65

Please see Master Response 1, *Baseline and Determination of Significance*, for a discussion of the difference between the baseline for analysis and the No Project Alternative.

Response to Comment LA-2-66

As discussed in Chapter 4 of the Draft PEIR, the State CEQA Guidelines (Section 15126.6) require consideration of the No Project alternative. Section 4.1, *Alternatives Screening Process*, of the Draft PEIR contains the following text on pages 4-1 and 4-2 which explains this. No changes to the text of the EIR are required.

- The range of alternatives must include the *No-Project* alternative. The no-project analysis will discuss the existing conditions at the time the notice of preparation was published, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved based on current plans and consistent with available infrastructure and community services. The No-Project alternative is not required to be feasible, meet any of the project objectives, or reduce the project's expected impacts to any degree.

Response to Comment LA-2-67

The commenter states that a discussion is needed of how federal agencies, especially USFWS, could deal with violation of MBTA. The County appreciates the comment, but notes that a discussion of compliance with MBTA is outside the scope of the Draft PEIR. USFWS is the agency with jurisdiction over migratory birds under the MBTA. The County would also like to note that the Draft PEIR finds that impacts on avian species, including birds protected under the MBTA, would be significant and unavoidable under CEQA. Please see also Master Response 7, *Migratory Bird Treaty Act*.

E.5 Nongovernmental Organizations

NGO-1—Audubon California

Michael Lynes
Director of Public Policy
Audubon California
400 Capitol Mall, Suite 1535
Sacramento, CA 95814
Tel. (415) 505-9743
Email: mlynes@audubon.org

July 21, 2014

Via Email
Sandra Rivera
Planning Department
Community Development Agency
224 W. Winton Avenue, Rm 111
Hayward, CA 94544
E-mail: sandra.rivera@acgov.org

RE: Draft of the Programmatic Environmental Impact Report for Altamont Pass Wind Resource Area

Dear Sandra:

These comments are submitted on behalf of Audubon California regarding the draft Program Environmental Impact Report for Altamont Pass Wind Resource Area Repowering, June 2014, State Clearinghouse Number 2010082063. ("PEIR") Our comments are provided to improve the PEIR and facilitating a repowering process that will promote responsible wind power generation while ensuring that local bird populations are conserved.

I. COMMENTS ON THE DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT

A. The Description of Existing Conditions Should Be Amended to Acknowledge the 2010 Settlement Agreement. 1

In 2010, the California Attorney General's Office, five chapters of the National Audubon Society, and NextEra, Inc. reached an agreement regarding NextEra's wind operations in the Altamont Pass (hereinafter, "the 2010 Agreement"). The 2010 Agreement provided a significant step forward for repowering in the APWRA. Moreover, it set forth several innovate measures intended to repower the APWRA in an economically-viable manner that monitored and protected bird populations. The settlement should be summarized in the DEIR.

B. The Project Description Should Be Amended to Reflect that Conservation of Local Bird Species Is a Priority. 2

As part of existing conditions, the DEIR summarizes the 2007 settlement between the Audubon chapters, Californians for Renewable Energy ("CARE"), and several wind companies, to resolve claims by Audubon and CARE that the County had renewed several APWRA wind operation permits without adequate environmental review (hereinafter "the 2007 Agreement"). However, the DEIR fails to mention a key provision of the 2007 Agreement, specifically that the parties would develop and implement a

NGO-1—Audubon California

Audubon – Comments on APWRA Draft PEIR
July 21, 2014
Page 2

Natural Communities Conservation Plan ("NCCP"), which are intended to produce conservation benefits for impacted species, or a similar plan "approved by the California Department of Fish & Game". (*Id.*, at 5) According to the 1991 Natural Communities Conservation Act ("NCCA"), a NCCP should include methods and procedures to "maintain or enhance the condition of a species" with the goal of avoiding listing species under the California Endangered Species Act (CESA). 2 cont.

The Project Description of the PEIR only lists that reduction of avian mortality through repowering is a project goal. (PEIR, at 2-2) The PEIR's failure to include this goal is problematic—and emphasized by the fact that it fails to mention of efforts—required under the 2007 Agreement—that wind operations management actively <u>conserve</u> species in the project area.

The PEIR should be revised to state that one of the program's goals is to maintain healthy, <u>sustainable</u> populations of birds and other wildlife within the APWRA. Achieving this goal is necessary for projects to in line with the requirements of the 2007 Agreement and state and federal laws.

Audubon has been repeatedly assured by County staff that the APP would replace the proposed NCCP in ensuring that impacted species would derive some conservation benefits (i.e., net gains to populations) to offset impacts from wind operations in the APWRA. Alameda County staff and its consults repeatedly assured Audubon that this goal would be addressed throughout our participation in the settlement discussions that led to the 2007 Agreement, the APWRA Steering Committee, development of the NCCP, and work on the EIR and Avian Protection Program. When the NCCP was abandoned, Audubon was again assured that active conservation of affected species would be priority.

But, as written, the PEIR fails to expressly acknowledge this legal requirement (under the settlement) or explain how activities covered under the PEIR will achieve this goal. Instead, we are assured that the "model" APP will serve the role that the NCCP promised to fulfill.

In Chapter 3, the PEIR acknowledges that a NCCP is an option from the Settlement Agreement and offers the optional APP in its place. Specifically, the PEIR states:

> As an alternative to the NCCP called for in the Settlement Agreement, the County has developed a draft *Avian Protection Program* (APP) to provide a framework and process for wind energy projects to comply with applicable statutes (e.g., MBTA and BGEPA) through the repowering process. The APP provided a broad evaluation of existing environmental conditions, bird use, and avian fatalities in the program area. It focused on avian mortality associated with repowering projects—specifically construction, operation, monitoring, and mitigation. The key provisions of the APP have been incorporated into this PEIR as impacts and mitigation measures. Project proponents will be expected to develop project-specific APPs, incorporating mitigation, monitoring, and adaptive management strategies as set forth in this PEIR.

(PEIR, at 3.4-7) Notably, the APP is not approved of by the CDFW. The PEIR should at least acknowledge that the APP does not meet the 2007 Agreement's plan requirement and that, at a minimum, the obligation under the settlement remains unmet.[1]

The Avian Protection Program does not quality as a NCCP or "similar plan" and will not be approved of by the California Dept. of Fish & Wildlife. Instead, the APP is designed to meet CEQA-level mitigation

[1] Audubon notes that under the 2010 Agreement, NextEra is no longer bound by the NCCP requirement. However, the 2007 Agreement remains in effect for other parties.

NGO-1—Audubon California

goals, which fall substantially short of ensuring affected species derive "conservation benefits" (i.e., that populations are healthier and more sustainable). 2 cont.

Finally, the APP is not provided with the draft PEIR. As the SRC has commented, it is difficult to determine which portions of the APP are included in the PEIR. It would be helpful for the public and decision makers to see the model APP which purports to meet the requirements of a NCCP or similar plan from the 2007 Agreement.

C. Impacts to Specific Bird Species

1. Golden Eagles 3

The PEIR should better describe the local population of golden eagles and provide a more sensitive analysis of impacts to the local population. Golden eagles have received a great deal of attention and study in the APWRA. The PEIR's analysis for golden eagles is surprisingly light. Audubon appreciates that the APP provides a more robust analysis, but some of the information provided in the APP should be in the PEIR as well (many readers will not read both documents). The PEIR should borrow from the APP and expressly (1) estimate the local population size, (2) estimate a limit for mortality, over which a decline in the local golden eagle population would be expected, (3) identify specific measures to keep the local golden eagle population viable, and (4) identify necessary mitigation measures that are proven to work.

It is not enough for the PEIR to punt the issue of eagle conservation to potential permitting under the BGEPA. First, there is no guarantee that any operator will get an eagle take permit, let alone implement its hypothetical management measures. Second, an eagle take permit may not adequately focus on impacts to the local population of golden eagles. Again, the 2007 Settlement Agreement anticipated a plan, like a NCCP, that would address impacts in a project area and provide required conservation measures within that area. As written, the PEIR does not set requirements that reach this level of conservation for eagles.

2. American Kestrel 4

American kestrel populations in the west are in decline. (*See, e.g.*, American Kestrel Partnership, available at http://kestrel.peregrinefund.org/kestrel-decline; *see also* http://birds.audubon.org/christmas-bird-count-and-breeding-bird-survey-document-population-trends-american-kestrel) While the APP provides a more robust analysis, the PEIR fails to note this issue adequately and fails to adequately assess impacts—especially cumulative impacts—arising from the projects covered by the PEIR.

3. Burrowing Owl 5

Mitigation Measure Bio-8b states that if an active burrow is found near a proposed work area and work cannot go forward outside of the nesting season, a "no-activity" zone will be established and extend at least 250 feet around the burrow. (PEIR, 3.4-83) The PEIR does not include information to support the proposed buffer zone. Has the 250-foot buffer been demonstrated to be adequate? If so, Audubon requests that the supporting information be presented in the PEIR.

MM Bio-8b also states that "passive relocation" may be used when burrowing owls are in a direct disturbance area during the non-breeding season. (*Id.*) Audubon is not aware of any studies that demonstrate that passive relocation of burrowing owls is adequate to avoid or minimize impacts to local

NGO-1—Audubon California

Audubon – Comments on APWRA Draft PEIR
July 21, 2014
Page 4

populations of burrowing owls. It is our understanding, such efforts often fail and cause significant disturbance to the local population. 5 cont.

MM Bio-9 states that burrowing owl habitat loss will be mitigated through "a conservation easement or by implementing alternative mitigation determined through consultation with CDFW…." (PEIR, at 3.4-86) Audubon would like to understand when this decision will be made and by whom. Also, Audubon is concerned about the lack of evidence that supports that conservation easements or other measures actually adequately mitigate for the loss of foraging habitat for burrowing owls.

4. Tricolored Blackbirds 6

The PEIR correctly identifies that Tricolored Blackbirds are a species of special concern in California. (PEIR, at 3.4-37) However, the PEIR should be amended to more fully describe the status of Tricolored Blackbird.

Tricolored blackbird populations are in a significant, precipitous decline. (*See* http://www.fresnobee.com/2014/03/15/3825370/dark-daysblackbirds.html) It is very possible that the species will be a candidate for the California and the federal endangered species lists. Once listed as endangered, the tricolored blackbird could present additional potential challenges if mortality due to wind operations at the APWRA continue. The rate of mortality is relatively low for tricolored blackbirds in the APWRA, but the PEIR should still better reflect the species' sensitivity and potential to create additional regulatory burdens for operators.

6. Western Meadowlark 7

Data from the 2005-2012 Avian Fatality Report indicate a high degree of mortality for western meadowlark. (Avian Fatality Report, Table 3-3, at p. 5 of 5; Table 3-4, at p. 4 of 5) According to the report, approximately 1100 western meadowlarks are killed in the APWRA by wind operations each year. (*Id.*)

While abundant, western meadowlarks have shown population declines in some parts of their range. (*See, e.g.*, http://www.mbr-pwrc.usgs.gov/bbs/grass/a5011.htm) Potential contributors to this decline involve habitat destruction and disturbance. (*Id.*)

Because the western meadowlark is abundant in the APWRA and suffers one of the highest rates of mortality, the PEIR should be improved to assess impacts to the species in the AWPRA and due to cumulative impacts based on other projects, land conversion, habitat loss and fragmentation, and disturbance in the region. While the western meadowlark is not current a special status species, it is suffering population declines and the programmatic EIR proposes to cover 20 years of operations and impacts. Therefore, the PEIR should be forward-thinking and consider impacts over this time to species such as the western meadowlark.

D. Avian Mortality Analysis Methods 8

Audubon shares the concerns raised by members of the Altamont SRC regarding the avian mortality analysis presented in the PEIR. Specifically, Audubon is concerned that the PEIR does not appear to clearly identify a baseline for the four focal raptor species (golden eagle, red-tailed hawk, American kestrel, and burrowing owl). Column 1 of Table 3.4-10 (p. 53) sets forth mortality rates, but it is unclear whether they are for non-repowered turbines. Moreover, the basis for the proposed rates are unclear 0 are they an average of rates reported from 2005-2011? What data sets or reports are being relied upon? Are there more recent data available to inform the analysis? 8 cont.

The "baseline" of unsustainably high historic fatality rates should *not* be used as either a threshold of significance (see PEIR, at 3.4-55) or as a trigger for implementing mitigation and adaptive management measures in the PEIR (see id., at 3.4-110-111). Rather, the "baseline" should only be used to evaluate relative success of repowering as compared with the old-generation turbines (i.e. percentage reduction in fatalities comparing new generation with old generation turbines).

Audubon acknowledges that the proper way to proceed with repowering in the Altamont is to consider the significance of impacts going forward, i.e. to not dwell overly long on past mortality.

E. Determination of Significance 9

The PEIR's section on the Determination of Significance is extremely difficult to read. It should be revised and made clarified. For example, the section includes the following, extremely complicated sentence:

> The analysis of impacts on biological resources, and in particular on avian species in the program area, accordingly, entailed the comparison of the existing condition of infrequent but regular and more or less predictable levels of avian mortality associated with the existing wind turbines—the baseline mortality rate defined above in *Avian Fatality Analysis Methods*—with the anticipated or calculated projection of the mortality rate that would result from implementation of the program or projects.

(PEIR, at 3.4-55) Aside from its readability, the statement erroneously opines about the "infrequent" levels of mortality in the program area. Audubon reminds the County that the APWRA has one of the highest rates of mortality of any wind farm *in the world*.

Perhaps more problematically, the statement indicates that overall mortality in the APWRA will be considered less than significant if is below the baseline established in the Avian Fatality Analysis Methods, several problems with which we note in Section D above.[2] We also echo the concerns provided by the SRC that the baseline levels—and therefore the threshold for determining the significance of impacts—are questionable and could bring the sufficiency of the PEIR into question. Audubon recommends that this section be revised to improve the quality of the PEIR.

Audubon is also concerned that the section does appear to have been informed by the 2010 Agreement (or at least does not acknowledge it). The section indicates that it was informed by the 2007 Agreement but omits mention of the 2010 Agreement, which set forth an iterative process by which data gathered from prior repowering projects would inform siting and management for subsequent phases. That should be the model for development and redevelopment in the APWRA going forward. We are particularly concerned that the APWRA be a level playing field and fair market. Companies that have agreed to be forward-

[2] Audubon believes that any mortality of protected species, including species protected by the MBTA and the BGEPA, should be considered a significant environmental impact. In the APWRA, this may be particularly so given the historic and cumulative impacts on local populations. For this reason, the 2010 Agreement instituted a rigorous process for siting, monitoring, and adaptive management.

NGO-1—Audubon California

Audubon – Comments on APWRA Draft PEIR
July 21, 2014
Page 6

thinking in their repowering efforts should not be at a disadvantage to companies that have yet to repower or that may seek to do the bare minimum set forth by the PEIR. 9 cont.

Under the model set forth in the 2010 Agreement, an appropriate threshold of significance for both Golden Hills I and other repowering projects in Alameda County with turbine sizes comparable to the Vasco Winds Project is to use the fatality rates for the Vasco Winds Project.[3] This threshold of significance would then be used to determine whether the next phases of repowering are meeting the Agreement's goal to continually reduce turbine-related raptor deaths through advanced micro-siting, and also would be used as triggers for the adaptive management and raptor fatality compensation requirements, as discussed further below.

In addition, Audubon notes that the threshold of significance mentioned at 3.4- 55 is inconsistent with the PEIR's correct statement at 3.4-98 that any avian mortality was considered a significant and unavoidable impact, and the implication at 3.4-99 that the threshold of significance is based on extrapolated fatality rates from the three previously repowered projects (Diablo Winds, Buena Vista and Vasco Winds), not on fatality rates from the old generation turbines.

F. The Impacts Analysis and Mitigation Measures Should Be Improved. 10

Audubon has concerns about several of the impacts analyses and proposed mitigation measures set forth in the PEIR. These are discussed in greater detail below.

Impact Bio-11a-1: Avian Mortality Resulting from Operation of Wind Turbines (Pages 98-103)
The PEIR provides in inadequate discussion of the latest scientific research regarding avian populations and impacts in the APWRA. The golden eagle analysis, for example, relies on studies that are more than ten years old. In particular, the PEIR should discuss and apply the recent and ongoing golden eagle and burrowing owl research being conducted at Altamont Pass by Dr. Shawn Smallwood, Doug Bell and Grainger Hunt et al. using scientific research mitigation funds provided by Next Era and administered by the East Bay Regional Park District pursuant to paragraph 6.0 of the 2010 Agreement.

Audubon is particularly concerned about population-level impacts to golden eagles and other affected species. The PEIR's analysis of these impacts local populations (i.e., AWPRA, or in Alameda County) and rangewide populations should be improved, including consideration of cumulative impacts from other factors affecting the species (habitat loss, drought, climate change, rodenticides, etc.) over the 30-year period considered in the PEIR for new projects.

Wind development is but one of the many factors affecting these species' population dynamics, but it is a significant and growing stressor for many raptor species. The PEIR should be clear as to how it derives its mortality estimates so they can be part of the larger consideration of impacts and management for affected species.

Specifically, are the fatality estimates for repowering presented as a range based on extrapolation to the entire Altamont of the fatality rates for the Diablo Winds, Buena Vista and Vasco Winds Projects, as set

[3] It is also appropriate for the PEIR to consider the fatality rates based on the three years of monitoring results for the Buena Vista Project in Contra Costa County. However, in developing an appropriate threshold of significance, it is important to bear in mind that the turbines used for the Buena Vista project are substantially smaller (1 MW) than the turbines that were used for the Vasco Winds Project (2.3 MW) and that will likely be used for repowering projects in Alameda County. The Diablo Winds turbines are probably too small to make this early repowering project of much relevance to current repowering efforts.

NGO-1—Audubon California

forth in Table 3.4-11? The same concern applies to the discussion of fatality estimates for the Golden Hills 1 and Patterson Pass projects at 3.4- 115-120 of the PEIR: it is not clear what the number of projected fatalities for each of the four focal raptor species (and other bird species) are expected to be and how the PEIR arrived at these estimates. Estimates that are widely variable (e.g., see PEIR, at 3.4-100 for burrowing owls) should be explained and narrowed. Moreover, to the extent possible, qualitative descriptors of impacts (e.g., a "small estimated increase") should be quantified. 10 cont.

Mitigation Measure BIO-11a: Prepare a project-specific avian protection plan 11
MM Bio-11a merely states:

> All project proponents will prepare a project-specific APP to specify measures and protocols consistent with the program-level mitigation measures that address avian mortality.

(PEIR, at 3.4-104) Again, Audubon is compelled to remind the County that "program-level mitigation measures" do not meet the requirements of the 2007 Agreement, requiring a NCCP or NCCP-equivalent plan approved of by the California Dept. of Fish & Wildlife. Mitigation is not conservation.

Moreover, the PEIR is unclear about what exactly will be included in a project-specific APP. Audubon is left to conclude that the promise of actual conservation benefits for affected species promised in the 2007 Agreement has once again been delayed and the likelihood of its fulfillment appears less likely than ever.

Mitigation Measure Bio-11b: Siting Turbines to Minimize Potential Mortality of Birds 12
MM Bio-11b should be revised to include more detailed language regarding micro-siting of new turbines as described in paragraph 4.0 of the 2010 Agreement. (*See* PEIR, at 3.4-104) It should also reference the most recent micro-siting studies being conducted by Dr. Shawn Smallwood, including but not limited to: *Siting Repowered Wind Turbines to Minimize Raptor Collisions at Vasco Winds*, Smallwood and Neher, 2010 and *Siting Wind Turbines to Minimize Raptor Collisions at Golden Hills Repowering Project, Altamont Pass Wind Resource Area*, Smallwood and Neher, 2014; and also reference the SRC siting guidelines, Document P-70.

Mitigation Measure Bio-11e: Retrofit Existing Infrastructure to Minimize Risk to 13
Audubon is extremely concerned about the reliance on retrofitting power poles as a primary mitigation measure. (MM Bio-11e, at 3.4-105) While the measure can reduce electrocutions when done correctly, the practice is often implemented poorly. Moreover, the "mitigation" measure is, arguably, performing an action that the owners of the power poles should already be undertaking, e.g., preventing the illegal killing of protected raptors by improving infrastructure. In any event, the PEIR should set forth an evidentiary basis for the sufficiency of this mitigation measure, set a criteria for appropriate and effective retrofits, and provide for a monitoring mechanism to ensure that retrofits occur and are effective. As with any mitigation measure, if power pole retrofits are ineffective, credit for the measure should not be provided.

Mitigation Measure Bio-11g: Implement Post-Construction Avian Fatality Monitoring 14
Audubon appreciates the hard work dedicated by the members of the Scientific Review Committee over the years and understands that there may be a consensus that a less formal "Technical Advisory Committee" may be the preferred venue for scientific review going forward. If a TAC is being created, it should be comprised of independent scientists with a broad range of expertise and reflect representatives from various stakeholders in the AWPRA (e.g., wildlife agencies, NGOs, industry, and independent

NGO-1—Audubon California

biologists). It would also be helpful to better define the TAC's roles and how its work products will be incorporated into management of the APWRA. 14 cont.

Moreover, MM Bio-11g should provide an explicit requirement and deadline for producing interim and final monitoring reports and for conducting bird and bat behavior and use surveys. The 2010 Agreement requires the monitoring program to prepare interim, annual monitoring reports within three months of completing each year of post-construction monitoring, a three-year monitoring report within six months of completing the first three years of post-construction monitoring, and a final two-year monitoring report within six months of completing the final two years of post-construction monitoring. The Agreement also requires the monitoring program to conduct bird and bat utilization and behavior studies, in consultation with the SRC (or TAC), for each phase of repowering "in order to inform and update siting analyses" for each subsequent phase of repowering and any future repowering efforts. The results of these use and behavior studies must be included in all monitoring reports.

Data from monitoring should also be made available to the public and for independent peer-reviewed analysis and publication. Transparency in the data collection and analysis process will improve the public's confidence that adequate scientific review of impacts and populations in the APWRA is occurring. It will also be essential for understanding changes to bird and bat populations in the APWRA over the 30-year period anticipated by the PEIR.

Mitigation Measure Bio-11h: Compensate for the Loss of Raptors 15
MM Bio-11h does not adequately describe how losses for raptors will be fully compensated. (See PEIR, at 107-110) For example, who will decide what specific "options" for compensation will apply to a given project and according to what process? Also, it is not clear why the compensation options must be provided in ten-year increments and whether the project operator must provide such compensation for the full thirty-year anticipated life of the project (i.e. three ten-year increments). Audubon notes that PEIR page 3.4-108 references the correct threshold of significance for the first ten year increment of compensation: the estimates of raptor fatalities for the Vasco Winds Project set forth in Table 3.4-10.

Mitigation Measure Bio-11i: Adaptive Management Program 16
Audubon is concerned that MM-Bio-11i is not adequately specific about how adaptive management measures will be implemented. (PEIR, at 3.4-110-111) We recommend that the PEIR be revised to adopt language from the 2010 Agreement, which would implement adaptive management measures when it is determined (preferably after consultation with the TAC) that "one more turbines are causing [a] significantly disproportionate" number of fatalities of focal raptors or bats. (2010 Agreement ¶ 5.2.) The PEIR also should specify a time frame by which adaptive management measures must be implemented (e.g., how long after monitoring results are available). All practicable management measures should be considered – including seasonal shutdowns, adjustment of cut-in speeds, and additional monitoring. Audubon is not aware of peer-reviewed studies demonstrating that blade-painting has not been shown to be an effective fatality reduction measure. If blade-painting or other experimental methods are to be relied upon, the PEIR should require an evidentiary showing that they are adequate before including them in the AMP.

Impact Bio-12a-1: Potential Mortality or Disturbance of Bats 17
The PEIR would be greatly improved with a strengthened impact analysis for bats. Currently, the PEIR, and Impact Bio-12a-1, is too general and its conclusions are inadequately supported. (PEIR, at 3.4-121) The PEIR should identify what bat surveys have occurred in the APWRA and environs. It should also describe how mitigation measures will reduce impacts to less than significant levels. As written, the PEIR fails to adequately characterize this information.

NGO-1—Audubon California

Impact Bio-14a-1: Turbine-Related Fatalities of Bats 17 cont.
The description of Impact Bio-14a-1 is vague and lacks adequate references. (*See* PEIR, at 3.4-125) It states that ""existing fatality data" and "trends observed at other wind energy facilities", but fails to identify the data, trends, or other wind facilities (or reports) referred to. Alameda County has done a very poor job of monitoring bat mortality in the APWRA and should look to other wind operation sites for better models for bat monitoring and conservation.

Mitigation Measure Bio-14b: Post-Construction Bat Fatality Monitoring
As mentioned above, bat mortality has received scant attention from Alameda County in the past, a process worsened by the failure to include a bat expert on the SRC or otherwise engaged in the stakeholder process. Audubon believes that, at a minimum, circumstances for bats in the APWRA would improve if bat fatality monitoring program included bat use and behavior as well as fatality studies, similar to avian monitoring and consistent with the terms set forth in the 2010 Agreement. Bat fatality monitoring should not be restricted to turbine roads and pads because these limitations are likely to result in a severe underestimation of fatality rates.

Mitigation Measure Bio-14d: Develop Bat Adaptive Management Plan
The PEIR should specify a time frame by which adaptive management measures must be implemented.

Impact Bio-14a-1: Turbine-Related Fatalities of Bats
Again, the PEIR should be revised to identify "existing fatality data" (and confidence in conclusions drawn from it) and what "trends observed at other wind energy facilities" are being relied upon.

Mitigation Measure Bio-14b: Post-Construction Bat Fatality Monitoring
The bat fatality monitoring program should include bat use and behavior as well as fatality studies, consistent with paragraph 5.1 of the Next Era-Attorney General Agreement. In addition, bat fatality monitoring cannot be restricted to turbine roads and pads. This is likely to result in a severe underestimation of fatality rates.

Mitigation Measure Bio-14d: Develop Bat Adaptive Management Plan
The PEIR should specify a time frame by which adaptive management measures must be implemented.

II. CONCLUSION

Audubon appreciates the opportunity to comment on the draft programmatic environmental impact report and to continue to participate on the APRWRA Steering Committee. We encourage the County to consider these comments and use them to improve the PEIR. If you would like to discuss this matter further, please do not hesitate to contact me at (415) 505-9743 or mlynes@audubon.org

Thank you,

Michael Lynes

Michael Lynes
Director of Public Policy
Audubon California

E.5.1 Comment Letter NGO-1—Audubon California

Response to Comment NGO-1-1

The commenter suggests that the 2010 Settlement Agreement should be summarized in the PEIR because this agreement sets forth innovative measures intended to repower the APWRA in an economically viable manner that monitors and protects bird populations. The County notes that it is not a party to the 2010 Agreement and thus has no responsibilities pursuant to the agreement. However, the County also notes that the Draft PEIR was informed by the measures within the 2010 Agreement and appreciates the time and effort that went into developing the agreement. To provide a more complete description of the existing conditions, the County has added the following summary following *2007 Settlement Agreement* on page 3.4-7 of the Draft PEIR.

2010 Settlement Agreement

On December 3, 2010, Audubon, CARE, NextEra, the People of the State of California, and the Attorney General entered into a settlement agreement. The repowering schedule in the 2010 Settlement Agreement entailed NextEra repowering old-generation turbines under its current ownership in the APWRA as soon as commercially reasonable, in three or fewer phases, with each phase comprising up to 80 MW and each phase undergoing CEQA review by means of an EIR. Phase 1 was the Vasco Winds project in Contra Costa County; Phases 2 and 3 would be projects in the Alameda County portion of the APWRA. Each phase of repowered turbines is subject to 3 years of postconstruction fatality monitoring, using the focal species identified in the 2007 Settlement Agreement as well as bats as benchmarks for evaluating effectiveness of repowering. The agreement is structured such that each phase of repowering is intended to inform the siting of turbines in subsequent phases. Mitigation fees to compensate for ongoing bird and bat fatalities were also established in the agreement. NextEra is the only wind operator in the APWRA that was a party to the 2010 Settlement Agreement. While the County is not a party to the 2010 Settlement Agreement and therefore has no responsibilities under the agreement, the repowering, conservation, and monitoring measures in the agreement were reviewed and incorporated into the mitigation measures in the PEIR as deemed appropriate by the County.

The County believes that many of the concepts in the 2010 Settlement Agreement have been incorporated into the PEIR. For example, Mitigation Measure BIO-11b requires repowering projects to conduct careful siting to minimize impacts, based on the best available siting models and/or guidelines; Mitigation Measure BIO-11g requires postconstruction fatality monitoring (including monitoring beginning again at year 10, as set forth in the 2010 Agreement); and Mitigation Measure BIO-11h requires compensation for avian species (noting NextEra's 2010 Agreement requirements). For more complete background, the 2007 and 2010 Settlement Agreements have been included in Appendix F, *Historical Documents*, of the Final PEIR.

Response to Comment NGO-1-2

The commenter states that program-level mitigation measures and program goals do not meet the requirements of the 2007 Settlement Agreement. The County has worked for many years in good faith to implement the 2007 Settlement Agreement. As noted in *History since 2001* on page 1-8 of the Draft PEIR, despite many years of effort, the County has been unable to develop an HCP/NCCP and believes that the integration of the provisions of the program APP into the PEIR is the best remaining approach to meet the goals of the 2007 Settlement Agreement. The County notes that the Draft PEIR includes numerous mitigation measures developed using a conservation approach. For example, Mitigation Measure BIO-11h requires repowered projects to compensate for the loss of every raptor, regardless of whether the repowered project reduces impacts from the existing project. Furthermore, the measures have been designed using a landscape-scale approach, so that the conservation actions provide the greatest possible mitigation benefits. The County believes that these measures and approaches are consistent with the goals of the 2007 Settlement Agreement.

As requested by the commenter, the draft Program APP (as described in *History since 2001* on page 1-8 of the Draft PEIR), has been included in Appendix F, *Historical Documents*, of the Final PEIR.

Response to Comment NGO-1-3

The commenter requests a better description of the local population of golden eagles and additional analysis of impacts on the local population. The commenter also suggests that the Draft PEIR punts the issue of eagle conservation to potential permitting under the BGEPA. In response to this comment, the County has expanded the *Golden Eagle* species account on pages 3.4-36 and 3.4-37 of the Draft PEIR as shown in Response to Comment FA-1-9.

The County notes that the Draft PEIR includes a discussion of the potential impacts on the local golden eagle population in the discussion of Impact BIO-11a-1 on page 3.4-101; however, regardless of this additional information, concludes that "turbine-related mortality reduces the resilience of the local golden eagle population." Additionally, the golden eagle conservation is addressed in the PEIR and not left to potential permitting under the BGEPA. Mitigation measure BIO-11h, beginning on page 3.4-107 of the Draft PEIR, requires each project to implement mitigation for every golden eagle killed during operations, regardless of whether the operator obtains a programmatic eagle take permit from USFWS.

Response to Comment NGO-1-4

The commenter states that the Draft PEIR fails to adequately address American kestrel status and impacts. The current status and life history information for American kestrel are provided on page 3.4-37 of the Draft PEIR. However, in response to this comment, the County has revised the first paragraph of the description of *American Kestrel* on page 3.4-37 of the Draft PEIR as shown below to further inform the PEIR.

> American kestrel is not a state- or federally listed species. However, it is protected under the MBTA and the California Fish and Game Code and is an APWRA focal species. <u>The North American Breeding Bird Survey has detected significant declines of American kestrel populations in many areas of the United States, including California (Smallwood and Bird 2002).</u>

The description of impacts on American kestrel beginning on page 3.4-99 of the Draft PEIR notes that "populations have declined over the western U.S. since the 1980s, pronouncedly so since the 1990s." Repowering is expected to have significant reductions in impacts on American kestrels. Nevertheless, the analysis concludes on page 3.4-104 of the Draft PEIR that for all avian species analyzed, fatalities would still be expected to occur and that, despite reductions in impacts, turbine related fatalities would result in a significant and unavoidable impacts even after the application of mitigation measures. Moreover, Mitigation measure BIO-11h, beginning on page 3.4-107 of the Draft PEIR, requires each project to undertake mitigation for every raptor killed during operations, regardless of whether the baseline fatality rate is exceeded. The County believes this conservation standard is consistent with that suggested by the commenter.

Response to Comment NGO-1-5

The commenter states that information is not presented in the Draft PEIR to support the proposed no-activity buffers presented for burrowing owl. As described in the second paragraph of *Impacts and Mitigation Measures* on page 3.4-56 of the Draft PEIR, mitigation measures for biological resources were developed to be consistent with the avoidance, minimization, and mitigation measures set forth in the EACCS. The 250-foot buffer distance presented in the Draft PEIR is consistent with the burrowing owl avoidance and minimization measures in Table 3-3 of the EACCS. Additionally, the County notes that Mitigation Measure BIO-8b in the Draft PEIR requires establishment of a no-activity zone that is "large enough to avoid nest abandonment and will extend a minimum of 250 feet around the burrow." Thus, the 250 feet presented in the Draft PEIR is the minimum distance necessary. The EACCS is described in *East Alameda County Conservation Strategy* on page 3.4-6 of the Draft PEIR.

The commenter also raises questions regarding "passive relocation" of burrowing owls. For a detailed discussion of passive relocation and the relevant revisions to the text of the Draft PEIR, please see Response to Comment LA-2-37. Because ground squirrel burrows are abundant in the program area, their availability for excluded owls to occupy should minimize the potential harm that could result from burrow exclusion. The text of Impact BIO-8a-1 and its variants (BIO-8a-1, BIO-8a-2, BIO-8b, and BIO-8c) has been revised as shown in Response to Comment LA-2-36.

As described in CDFW's *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012:11–13), the conservation easement or alternative mitigation for the loss of occupied burrowing owl habitat will be in place prior to the habitat being altered or destroyed and before any owls are excluded from burrows. The project proponent would work with CDFW to develop the compensation plan, which would be reviewed and approved by the County. Mitigation Measure BIO-9 has been revised as shown below.

> If construction activities would 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 permanently protecting mitigation land through a conservation easement or by implementing alternative mitigation determined through consultation with CDFW as described in its *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012:11–13). The project proponent will work with CDFW to develop the compensation plan, which will be subject to County review and approval.

The commenter also questions the efficacy of conservation easements as compensatory mitigation for loss of burrowing owl foraging habitat. This is a standard mitigation approach as described in CDFW's *Staff Report on Burrowing Owl Mitigation*.

Response to Comment NGO-1-6

The commenter states that the PEIR should be amended to more fully describe the status of tricolored blackbird, but also notes that the rate of mortality for tricolored blackbird is relatively low. The commenter observes that it is possible that the species will be a candidate for the California and federal endangered species lists. The County points out that it is required to consider that status of species at the time the Draft PEIR is prepared. The description of the status of tricolored blackbird on page 3.4-40 correctly discloses the current status as a species of special concern in California. Additionally, the species description on page 3.4-40 notes that surveys have "confirmed a significant declining trend in California … with a particularly dramatic decline noted after 1994." Moreover, the County notes that impacts on native non-raptors—a category that includes tricolored blackbird—

were found in the Draft PEIR to be significant and unavoidable. Nevertheless, the second paragraph of *Tricolored Blackbird* on page 3.4-40 of the Draft PEIR has been revised as shown below with the most current status information.

> Surveys during the 1990s (Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000) confirmed a significant declining trend in California populations since the 1930s, with a particularly dramatic decline noted after 1994. Statewide surveys conducted during the 2000s indicate some recovery from the 1999 low; however, the population increases have primarily been limited to the San Joaquin Valley and the Tulare Basin (Kyle and Kelsey 2011). A total of 145,135 tricolored blackbirds~~259,322 adults~~ were counted during the most recent (2014~~11~~) statewide survey, with Madera, Placer, Sacramento, and~~Kern,~~ Tulare~~, and Merced~~ Counties ~~in the San Joaquin Valley~~ accounting for about 64~~88~~% of the total population in April 2014~~early spring~~ (Meese 2014:6,8~~Kyle and Kelsey 2011~~). ~~The 2011~~The number of tricolored blackbirds statewide decreased from approximately 395,000 in 2008 to 259,000 in 2011, a decline of 34%~~ count represents a population decline of about 35% from the previous statewide count of 394,848 birds in 2008.~~ Breeding surveys conducted between 1994 and 2011~~over the last 15 years have~~ documented ~~wide fluctuations in~~ tricolored blackbird populations that fluctuated from just under 100,000 birds to nearly 400,000 birds~~, with populations stabilizing between 250,000 and 400,000 over the last 6 years~~ (Kyle and Kelsey 2011). From 2011 to 2014, the number of tricolored blackbirds declined by 44%, from approximately 259,000 to 145,000. The decline in tricolored blackbirds from 2008 to 2014 was 64%. While the number of tricolored blackbirds is down statewide, declines are most pronounced in the San Joaquin Valley (78% decline between 2008 and 2014) and along the Central Coast (91% decline between 2008 and 2014). Conversely, populations in Sacramento County and the Sierra Nevada Foothills have increased by 145% since 2008. Overall, the rate of decline appears to be accelerating, and additional efforts to reduce the rate of decline may be necessary (Meese 2014:6–7, 13–15).~~The data also indicate that populations continue to decline in several areas of the state where the species was formerly common, particularly in southern California and several Central Valley counties, including San Joaquin County, where no active colonies have been documented since 2004, and in Sacramento and Fresno Counties. Thus, while population numbers statewide may have stabilized, tricolored blackbirds appear to have concentrated into a significantly smaller effective range (Kyle and Kelsey 2011).~~

Response to Comment NGO-1-7

The commenter notes that the Draft PEIR should assess impacts on western meadowlark in view of high mortalities from wind turbines in the APWRA. As noted by the commenter, western meadowlark is not a special-status species as defined in the Draft PEIR. Impacts on native non-raptors—including western meadowlark—were found in the Draft PEIR to be significant and unavoidable. Overall, the County believes that the conservation and adaptive management mitigation measures are sufficiently flexible and robust to allow the County to adapt to changing conditions in the future to ensure the conservation of species as needed.

Response to Comment NGO-1-8

The commenter states that the Draft PEIR does not appear to clearly identify a baseline for the four focal species. Please see Master Response 1, *Baseline and Determination of Significance*.

The commenter also states that the Draft EIR is unclear with respect to the data sets or reports being relied upon for the analysis. Please see Master Response 3, *Avian Mortality Rates Methodology for Existing Conditions*, regarding the methodology for determining baseline fatality rates.

Response to Comment NGO-1-9

The commenter suggests that additional clarifications are required regarding the determination of significance in the Draft PEIR. The County has prepared Master Response 1, *Baseline and Determination of Significance*, in response to this and related comments. The County believes that the clarifications provided address the commenter's concerns.

Response to Comment NGO-1-10

The commenter notes several concerns regarding the impact analysis and mitigation measures in the Draft PEIR. First, the commenter suggests that additional information regarding the local population of golden eagles, including current scientific research and studies, should be discussed. The County has added information regarding the golden eagle population status and current studies to the species account on page 3.4-37 of the Draft PEIR as indicated in Response to Comment NGO-1-3.

The commenter also notes concerns regarding population-level impacts on golden eagles and other affected species, including a consideration of cumulative impacts from other factors affecting the species over the 30-year period considered in the Draft PEIR for new projects. The County appreciates the comment but refers the commenter to comment FA-1-6 from USFWS stating that the County should limit take within the overall APWRA to fewer than 29 eagles each year to maintain the golden eagle population. Please refer to Response to Comment FA-1-6, which notes that take levels following repowering in the APWRA are estimated to be fewer than 29 eagles each year as suggested by USFWS. However, regardless of the expected reduction in impacts on golden eagles, the County has determined that repowering projects would continue to affect golden eagles as well as other migratory birds, concluding that these impacts are significant and unavoidable even after implementation of mitigation measures.

The commenter also notes that the Draft PEIR should be clear as to how mortality estimates are derived. Please see Master Response 4, *Estimated Avian Mortality Rates Methodology*, for a detailed description of the methodology used to estimate fatalities after repowering.

Response to Comment NGO-1-11

The commenter restates that program level mitigation measures do not meet the requirements for the 2007 Settlement Agreement. Please see Response to Comment NGO-1-2.

The commenter also states that the Draft PEIR is unclear with respect to the requirements of the project-specific APPs. Please see Master Response 8, *Avian Protection Plan*, for a detailed discussion of the intent and requirements of the project-specific APPs.

Response to Comment NGO-1-12

The commenter notes that Mitigation Measure BIO-11b, regarding the siting of turbines to minimize the avian mortality, should be revised to reflect greater detail, including references to other micro-siting studies. Please see Response to Comment LA-2-47 for a response to this comment and revisions to Mitigation Measure BIO-11b.

Response to Comment NGO-1-13

The commenter suggests that retrofitting power poles, as outlined in Mitigation Measure BIO-11e, should not be a primary mitigation measure. The County notes that Mitigation Measure BIO-11e is one of many avian mitigation measures intended to address avian mortality issues on a comprehensive basis. While the County understands the commenter's position that the retrofits should be conducted regardless of whether the activity is included as a mitigation measure, inclusion of the measure in the PEIR allows the County to include it in the MMRP to ensure that it is completed. The County also notes that the measure is intended to address existing infrastructure that is retained for future use after repowering. The County believes that in most cases, existing infrastructure will not be reused and will simply be removed. Moreover, the County has cited APLIC guidelines—which the County believes to be the state-of-the-art guidelines for avian protection on power lines—for conducting the retrofits. Because the commenter does not provide an alternative source to ensure that retrofits are more effective, the County is retaining the mitigation measure as written in the Draft PEIR.

Response to Comment NGO-1-14

The commenter provides suggestions for the makeup of the TAC and requests a better definition of its roles and responsibilities. The commenter also suggests that additional reporting timelines and guidelines should be incorporated into the fatality monitoring mitigation measure, and suggests that data from the monitoring should be made available to the public to ensure transparency. Please see Master Response 5, *Avian Fatality Monitoring Methodology*, and secondarily Master Response 6, *Technical Advisory Committee*. The County appreciates the commenter's suggestions and believes that they have been incorporated into the description of the TAC in Mitigation Measure BIO-11g.

Response to Comment NGO-1-15

The commenter states that Mitigation Measure BIO-11h does not sufficiently describe how losses for raptors will be fully compensated. Please see Master Response 9, *Avian Compensatory Mitigation*, for revisions to Mitigation Measure BIO-11h.

The commenter also notes that it is not clear why compensation options must be provided in 10-year increments and whether the project operator must provide such compensation for the full operating life of the project. Please see Master Response 9, *Avian Compensatory Mitigation,* for more detail regarding the compensatory mitigation increments. Compensation under Mitigation Measure BIO-11h is for the life of the project (i.e., three 10-year increments). The County believes that completing mitigation in larger increments (such as 10-year increments) will allow for the most comprehensive mitigation approach and facilitate larger and more cost-effective land acquisitions. Nevertheless, as shown in Master Response 9, *Avian Compensatory Mitigation*, Mitigation Measure BIO-11h has been revised to allow one-time adjustments within the 10-year timeframe to account for the results of fatality monitoring efforts.

Response to Comment NGO-1-16

The commenter states that implementation of Mitigation Measure BIO-11i is not clear as presented in the Draft PEIR. Please see Master Response 10, *Adaptive Management*, for revisions made to Mitigation Measure BIO-11i to enhance its clarity and to ensure that it is implementable.

The commenter also recommends that the County include language from the 2010 Agreement requiring implementation of adaptive management measures when it is determined that one or more turbines are causing a “significantly disproportionate” number of fatalities. The County appreciates this suggestion and has incorporated this concept into Mitigation Measure BIO-11i as shown in Master Response 10, *Adaptive Management*.

The commenter recommends a consideration of all practical management measures to reduce fatalities. As described in Master Response 10, Mitigation Measure BIO-11i has been revised to note that project proponents, the TAC, and the County will consider the best available measures at the time the adaptive management plans are prepared and in consideration of the specific management needs (i.e., for individual species and/or groups of species).

Response to Comment NGO-1-17

For a response to this comment, please see Master Response 11, *Bat Impacts and Mitigation*.

NGO-2—Save Mount Diablo

July 18th, 2014

Sandra Rivera
Assistant Planning Director
Alameda County Community Development Agency
Planning Department
224 W. Winton Room 111
Hayward, CA 94544

RE: Comments on the Draft Program Environmental Impact Report (dpEIR) for the Proposed Altamont Pass Wind Resource Area Repowering Project, SC# 2010082063

Dear Ms. Rivera,

Save Mount Diablo (SMD) is a non-profit conservation organization founded in 1971 which acquires land for addition to parks on and around Mount Diablo and monitors land use planning which might affect protected lands. We build trails, restore habitat, and are involved in environmental education. In 1971 there was just one park on Mount Diablo totaling 6,778 acres; today there are almost 50 parks and preserves around Mount Diablo totaling 110,000 acres. We include more than 8,000 donors and supporters.

We appreciate the opportunity to comment on the dpEIR for the proposed Altamont Pass Wind Resource Area Repowering project (APWRAR). We feel the dpEIR could be strengthened and made clearer in several areas dealing with mitigation, monitoring, and the project description. Describing a priority system for different mitigation strategies is important to analyze the potential effectiveness of these strategies. In addition, the method used to define the Program Area should be modified and the calculation of baseline avian mortality rates should incorporate new information. Issues that we feel merit changes in the dpEIR are discussed below. 1

Comments on dpEIR Section 3.4.2, Environmental Impacts to Biological Resources

Raptor Mortality Mitigation Strategy Prioritization – Conservation Easement Acquisition 2
The dpEIR recognizes on pg. 3.4-107 that a landscape-scale approach to mitigation and conservation is now central to the mitigation strategy of the Department of the Interior and would likely have the greatest mitigation benefits. We feel that if the dpEIR prioritized the options described to compensate for the proposed APWRAR's impacts on raptors, the EIR would be strengthened because the effectiveness of proposed mitigation measures would be clearer and easier to analyze. If higher priority options are more likely to be exercised, lending higher priority options more weight would permit a better analysis of the adequacy of proposed mitigation measures.

In addition, placing a high priority on the "contribute to regional conservation of raptor habitat" by acquisition of conservation easements conservation measure option (described on pg. 3.4-110), would be a big step towards achieving the County's stated hope that "a more comprehensive landscape-level approach to mitigation will be adopted to benefit a broader suite of species than might benefit from more species-specific measures."

1901 Olympic Blvd., # 320, Walnut Creek, CA 94596 • T (925) 947-3535 • SaveMountDiablo.org • Tax ID # 94-2681735

Save Mount Diablo
PRESERVE • DEFEND • RESTORE • ENJOY

NGO-2—Save Mount Diablo

One of the main principles of conservation biology is that habitat connectivity helps maintain biodiversity, reduces harmful edge effects, and sustain ecological gradients and processes. If habitat becomes fragmented, the smaller areas of habitat that remain may not contain enough resources and habitat features to allow for the persistence of the full suite of species and ecological processes that were present when the landscape was whole. Plants and wildlife may also be unable to move or colonize other larger patches due to the habitat barriers that fragment the landscape, effectively creating small isolated populations that lack the resources to sustain themselves and will eventually disappear. By the same token, research shows that many species will eventually disappear from protected areas that are isolated from each other and too small to contain the full range of habitats and resources these species need to retain a viable population. 2 cont.

By making the acquisition of conservation easements located in areas that would connect existing protected areas in the Altamont a high priority option to compensate for the proposed APWRAR's impact on raptors, a highly connected landscape-level network of protected habitat could be created. Raptors, other wildlife, and threatened plant species would all benefit from this large, connected expanse of protected habitat. The mitigation of terrestrial impacts of repowering through the acquisition of conservation easements should also aim to connect already existing mitigation and other protected land.

A large number of existing conservation easements in the region have demonstrated that existing ranching practices can often continue on easement lands without endangering target biological resources. Therefore the landowners in these areas may be very open to the possibility of easements being purchased over their land.

While prioritizing the acquisition of conservation easements to connect currently protected land in the area would help protect a broad suite of species, placing a more focused species-specific measure targeting raptors as second in priority could more directly address specific threats to raptors and effectively compensate for raptor mortality. Retrofitting high-risk electrical infrastructure to compensate for the loss of raptors would be an effective species-specific complement to the broader high priority measure of acquisition of conservation easements. It would also be more effective than other options discussed under Mitigation Measure BIO 11-h, such as "contributing to raptor recovery efforts." While raptor recovery centers do great work, over-emphasizing such an option would only treat injured raptors, not remove the cause of their injury, as retrofitting electrical infrastructure would. 3

More detail should be added to the discussion of mitigation measures, and specifically conservation easements, in the EIR to fully understand how these measures would be effective. This includes how mitigation would be binding and enforceable, and with respect to conservation easements, the potential role of entities like the Alameda County Partnership for Land Conservation and Stewardship (PLCS). With regard to retrofitting electrical infrastructure, it is not entirely clear how Mitigation Measure BIO-11e and the "retrofitting high-risk electrical infrastructure" option under Mitigation Measure BIO-11h differ. Would such activities under BIO-11e only occur within areas owned by project operators, and those under BIO11-h occur outside of these areas? The dpEIR should make these differences clearer so reviewers can better understand and these measures and evaluate their potential effectiveness. 4

Incorporating Recent Data into Baseline Avian Mortality Estimates 5
Section 3.4.2 of the dpEIR discusses how baseline avian mortality rates were calculated using data from ICF International 2013[1]. These baseline estimates will are used to determine thresholds of significance

[1] ICF International. 2013. Altamont Pass Wind Resource Area Bird Fatality Study, Bird Years 2005-2011. November. M87. (ICF 00904.08.) Sacramento, CA. Prepared for Alameda County Community Development Agency, Hayward, CA.

2

NGO-2—Save Mount Diablo

and implementation of adaptive management measures for the repowering program, and are therefore extremely important calculations that should be based on the best available science. We note that another more recent study (ICF International 2014[2]) is available that could provide useful data for the baseline fatality rate calculations. ICF International 2014 includes data from bird year 2012 that is not included in the earlier study used to calculate baseline avian mortality rates. ICF International 2014 indicates increases in the 2012 annual adjusted fatality rate relative to 2011 for three of the four focal species (American kestrel, Golden eagle, and red-tailed hawk). In addition, 2012 appears to have been the deadliest year out of all years analyzed for American kestrel and Golden eagle (Table 3-3 in ICF International 2014). The EIR should include a discussion of this new information and its implications for the APWRAR. 5 cont.

Bird and Bat Mortality Monitoring Clarification on Seasonal Shutdowns

Mitigation Measure BIO-11g describes the postconstruction avian fatality monitoring for repowering projects. While it states that a technical advisory committee (TAC) will be formed to oversee monitoring and consult on adaptive management measures, it does not specify the TAC's role in the potential implementation of seasonal shutdowns should mortality rates exceed the established baseline. Would the TAC recommend implementation of seasonal shutdowns, or would it simply recommend that adaptive management measures be taken, which may or may not include seasonal shutdowns? Adding more detail on this point would strengthen and improve this mitigation measure. 6

Micro-siting and General Siting Near Brushy Peak Regional Preserve

We are encouraged that the dpEIR specifically addresses micro-siting of turbines in Mitigation Measure BIO-11b. We suggest modifying the language in this measure to make it clearer that micro-siting will occur and that the purpose of micro-siting will be to minimize avian collision risk. For example, we suggest changing the sentence on pg. 3.4-104 from "All project proponents will use the best information available to site turbines to reduce avian collision risk…" to "All project proponents will use the best information available to site all turbines to minimize avian collision risk…" This change would improve the dpEIR and allow a better understanding of what the mitigation measure proposes and how effective it may be. In addition, the EIR should include text specifying that models used to site turbines in locations that minimize avian collision risk specifically take into account the large size and height of the new turbines that are proposed for repowering. Adding a graphic to the dpEIR such as the one below (Figure 1) would also provide an example of how micro-siting would likely occur (though not necessarily using that specific model). 7

---

[2] ICF International. 2014. Altamont Pass Wind Resource Area Bird Fatality Study, Bird Years 2005-2012. Final. M101. (ICF 00904.08.) Sacramento, CA. Prepared for Alameda County Community Development Agency, Hayward, CA.

3

NGO-2—Save Mount Diablo

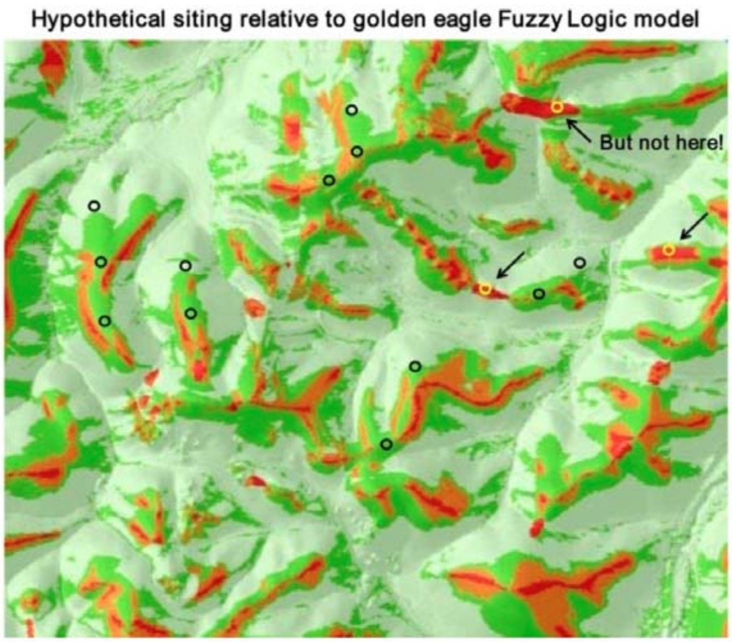


Figure 1. Hazard siting model (specifically, a Fuzzy Logic model) developed for golden eagle. Image taken from a presentation[3] prepared by Dr. Shawn Smallwood, Dr. Lee Neher, and Dr. Douglas Bell. Green areas are areas where wind turbines could be placed that present low risk to golden eagle. Red color indicates areas of high risk to golden eagle. Black circles indicate potential wind turbine locations in low risk areas. Yellow circles indicate potential wind turbine siting locations that should be avoided.

It is also extremely important that the EIR detail the oversight that will occur throughout the repowering process to ensure that micro-siting using the best available science does actually occur. This would be associated with ensuring that Mitigation Measure BIO-11b is binding and enforceable. A simple way to accomplish this would be to have County staff conduct inspections of wind energy repowering sites with siting model maps to ensure that turbines are being placed where models indicate low risk of striking focal raptor species. 8

Regarding general siting in the Altamont, we believe that providing a turbine-free buffer between Brushy Peak Regional Preserve and the APWRA would enhance the value of the Preserve by reducing mortality of birds that use the Preserve due to collisions with wind turbines. The EIR could provide program-level direction for the wind turbines adjacent to the preserve (identified in ICF International 2014 as BLOB 13 and consisting of model Kenetech 56-100 wind turbines) that if and when these turbine arrays undergo repowering, no turbines should be placed on the western half of these turbine strings. Larger fourth-generation turbines could still be placed on the eastern turbine strings farther from the Preserve. This would allow wind energy repowering in that cluster but also provide a buffer between the turbines and the Preserve. 9

[3] http://www.altamontsrc.org/alt_doc/p200_smallwood_2_17_11_presentation_on_siting_hazard_model.pdf

4

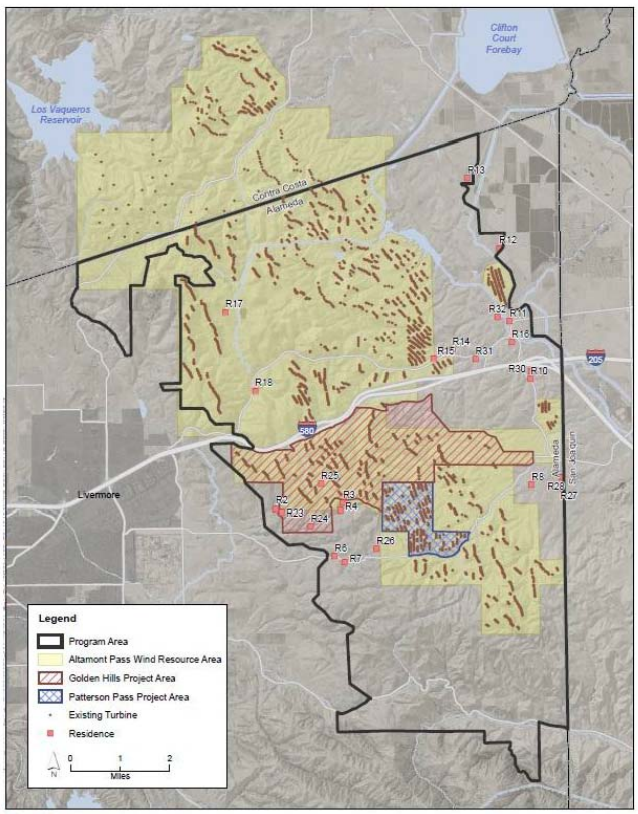
NGO-2—Save Mount Diablo

Comments on dpEIR Section 2.1, Program Location and Program Area

Inappropriate Use of the NCCP/HCP Boundary to Define Program Area 10

Section 2.1 in the dpEIR describes how a new boundary for the APWRA was developed during the incomplete NCCP/HCP process, and that this "revised boundary" is used to define the program area. It also states that "repowered wind turbines may be constructed anywhere within this revised boundary."

We believe this is an inaccurate and inappropriate way to define the Program Area for the APWRAR because the NCCP/HCP process was never completed and the "revised boundary" the dpEIR refers to was never finalized or put through a public review process. As Figure 1-2 (pictured below) in the dpEIR clearly shows, the Program Area includes large areas to the east and south of the current limits of the Altamont Pass Wind Resource Area. To propose that such a large area (≥30% or more of the Alameda County portion of the current Altamont Pass Wind Resource Area) could be opened up to wind energy development without public review is a major flaw that the EIR must correct. The EIR should be changed to redefine the Program Area and the area where repowered wind turbines may be constructed as the current official and accepted limits of the Altamont Pass Wind Resource Area.



Altamont Pass Wind Resource Area Repowering Program

Figure 1-2 Program Area

Figure 1-2 from dpEIR. Program Area.

5

NGO-2—Save Mount Diablo

Comments on dpEIR Section 2.4.5 and Other Sections Discussing Site Reclamation

Mechanisms to Ensure Reclamation Occurs

While the dpEIR states that wind energy companies will prepare site reclamation plans to be approved by the County after repower, there are currently many old turbine pads and foundations that have not been in use for years just sitting in the Altamont. In some cases funding shortages are blamed for failure to remove old infrastructure that is no longer being used. To ensure that site reclamation proceeds as it is intended, the EIR should specify a time by which site reclamation should be achieved and financial plans that ensure sufficient funding is available for companies to reclaim sites. For example, the EIR could specify all sites will be reclaimed within one year of decommissioning and describe a mechanism in which wind power companies pay into an account, perhaps managed by the County, that is expressly maintained for the purpose of site reclamation post-repower and that receives funds while projects are still in operation before the funds are actually needed. 11

We recognize that the site specific reclamation plans are useful and necessary, but the EIR must explain how site reclamation mitigation measures will be binding and enforceable. One aspect of that is ensuring there will be sufficient funds to reclaim sites when they are no longer in operation. The mechanism described above is just one way this could work. The EIR could describe several options, but each should be enforceable to avoid in the future the current situation that exists at some sites in the Altamont, where foundations and turbine pads that should have been reclaimed long ago for some reason remain. 12

Comments on dpEIR Section 2.6, Specific Project Descriptions

Adding Detail on Rotor-swept Area for the Golden Hills and Patterson Pass Projects 13

We are encouraged that the dpEIR proposes to follow the general repowering trend of replacing many old turbines with substantially fewer new ones. Specifically, the Golden Hills project would reduce the number of turbines after repowering by approximately 93%, and the Patterson Pass project by about 96%.

However, while the dpEIR includes information on the number of turbines to be removed and installed for the Golden Hills and Patterson Pass projects, it does not include information on the change in rotor-swept area that repowering of these projects would cause. It is possible that even though the number of turbines would be greatly reduced through repowering, due to their larger size, the rotor-swept area (the "danger-zone" for birds and bats) of the third-and fourth-generation turbines to be installed in the projects would stay the same or even increase.

While the dpEIR references studies that suggest windfarms utilizing larger third – and fourth-generation turbines may have significantly less impact on birds than first- and second-generation turbines, other studies suggest the possibility that the newer, larger turbines may actually have greater impacts on birds (Loss et al. 2013[4]). Regardless, the dpEIR itself recognizes that "considerable uncertainty remains regarding the effects of repowering on avian and bat mortality." Therefore, all the metrics that could affect the mortality of birds and bats due to repowering, including changes in the rotor-swept area of project turbines after repowering, should be included and analyzed in the EIR.

---

[4] Loss, S.R, T. Will, P. P. Marra. 2013. Estimates of bird collision mortality at wind facilities in the contiguous United States. Biological Conservation 168: 201-209.

6

NGO-2—Save Mount Diablo

We note that the dpEIR already provides information on the hub height of the new turbines, and suggests that the new turbine rotors would sweep an area above the heights most used by birds. However, calculations of how the amount of rotor-swept area existing in the Golden Hills and Patterson Pass project areas would change after repowering are not included. A detailed accounting of changes in rotor-swept area for these projects, and clear direction in the EIR that environmental review documents for future projects currently analyzed at the program level should also include such information, would provide the public, agency reviewers, and commenters a better sense of what the APWRAR proposes and its potential effects on birds. 13 cont.

The role of turbine height, rotor-swept area, and other turbine characteristics in bird collisions with wind turbines is currently a topic of intense research (Loss et al. 2013, Smallwood 2013[5]), and the APWRAR should provide much- needed high quality data to aid research efforts. Including more detailed information on rotor-swept area would permit a satisfactory analysis of the APWRAR's impacts on birds as well as facilitate current and future scientific research.

Thank you for the opportunity to provide comments.

Sincerely,
Juan Pablo Galván
Land Use Planner

[5] Smallwood, K.S. 2013. Comparing bird and bat fatality-rate estimates among North American wind-energy projects. Wildlife Society Bulletin 37: 19-33.

7

E.5.2 Comment Letter NGO-2—Save Mount Diablo

Response to Comment NGO-2-1

The commenter summarizes several issues covered in detail in the comment letter. Responses to individual comments are provided below.

Response to Comment NGO-2-2

The commenter expresses the opinion that the mitigation options contained in Mitigation Measure BIO-11h should prioritize conservation easement acquisition. Because this is a program-level EIR and will cover a number of repowering projects over a long period of time, the County intends to build in flexibility to address specific project characteristics as projects are proposed and reviewed in the future. Please see Master Response 9, *Avian Compensatory Mitigation*, for revisions to Mitigation Measure BIO-11h.

Response to Comment NGO-2-3

The commenter expresses additional opinions regarding the prioritization of mitigation, such as the options contained in Mitigation Measure BIO-11h. Please see Master Response 9, *Avian Compensatory Mitigation*, for revisions to Mitigation Measure BIO-11h to clarify the County's conservation approach. The commenter also notes that some options, such as contributions to raptor recovery efforts, which are effective and necessary for saving individual raptors, may not be as effective as some other measures because they do not remove the underlying cause of the injury. The County generally agrees with this comment and has revised Mitigation Measure BIO-11h to remove less effective options as shown in Master Response 9, *Avian Compensatory Mitigation*.

Response to Comment NGO-2-4

The commenter suggests that more detail should be added to mitigation measures to specify how the mitigation would be binding and enforceable and to describe the potential role of entities such as the Alameda County Partnership for Land Conservation and Stewardship (PLCS). The environmental analysis for future repowering projects would be tiered from this PEIR. Individual projects would undergo review and mitigation would be applied, as appropriate, for the anticipated impacts of the specific projects. Specific projects, if approved, would include a mitigation monitoring and reporting program (MMRP), which would specify the mitigation measures and monitoring requirements and responsibilities to ensure that the measures are completed as designed. While the PLCS may be an appropriate entity to facilitate land conservation, there may be others, and the County does not intend to limit conservation easement holders in the PEIR.

The commenter also questions how Mitigation Measure BIO-11e and the option of retrofitting of high-risk electrical infrastructure presented in Mitigation Measure BIO-11h are different. Mitigation Measure BIO-11e requires project proponents to retrofit any existing facilities within their specific project boundaries to minimize impacts on all raptors. The measure essentially recognizes that some facilities may be reused after repowering and requires them to be retrofitted to be avian safe. The number and extent of these facilities is unknown and would depend on the specific project designs. The retrofitting option under Mitigation Measure BIO-11h is primarily focused on eagles and is meant to serve as part of a package of comprehensive measures to mitigate impacts on raptors and other birds, including golden eagles. In accordance with the USFWS ECP Guidelines, numerous poles in areas with a high risk for electrocutions are required to be retrofitted. The County accordingly believes that both measures are necessary to avoid and minimize impacts on raptors.

Response to Comment NGO-2-5

Please see Master Response 3, *Avian Mortality Rates Methodology for Existing Conditions*, for a response to this comment.

Response to Comment NGO-2-6

Please see Master Responses 6, *Technical Advisory Committee*, and Master Response 10, *Adaptive Management*, for response to issues raised in this comment. Specific information pertaining to ADMMs for bats is presented in Master Response11, *Bat Impacts and Mitigation*.

Response to Comment NGO-2-7

The commenter suggests several changes to Mitigation Measure BIO-11b to clarify that turbines will be placed through careful micro-siting with the purpose of minimizing avian collision risk. Please see Response to Comment FA-1-14 and revisions of Mitigation Measure BIO-11b as shown in Response to Comment FA-1-14. Please also see Response to Comment LA-1-62, which provides further information on the process that will be used to review siting efforts by the TAC.

Response to Comment NGO-2-8

The commenter emphasizes the importance of oversight during the micro-siting process using the best available science. Please see Response to Comment LA-1-62, which provides further information on the process that will be used by the TAC to review siting efforts.

Response to Comment NGO-2-9

The commenter suggests that the County should establish a buffer between Brushy Peak and the APWRA. Please see Response to Comment LA-1-6 for a response to this comment.

Response to Comment NGO-2-10

Please see Master Response 2, *Program Area Boundary*, for a response to this comment.

Response to Comment NGO-2-11

The County requires reclamation and financial assurances for completion of reclamation as conditions of approval of CUPs for windfarms. Required reclamation is described in detail in *Reclamation Activities* on pages 2-22 and 2-23 of the Draft PEIR.

Response to Comment NGO-2-12

The County requires reclamation and financial assurances for completion of reclamation as conditions of approval of CUPs for windfarms. Required reclamation is described in detail in *Reclamation Activities* on pages 2-22 and 2-23 of the Draft PEIR.

Response to Comment NGO-2-13

The commenter notes that rotor-swept area is an important metric when comparing potential impacts on birds, and states that all the metrics associated with repowering that could affect the mortality of birds and bats—including changes in the rotor-swept area of project turbines—should be included and analyzed in the PEIR at both the program and project levels.

While common sense would suggest that the amount of air space swept by a rotor should play a role in bird and bat fatality, in a meta-analysis of fatality data from multiple wind energy sites in North America, Barclay et al. (2007:384) looked at blade diameters ranging from 18 to 90 meters and found no significant correlation with bat or bird fatality.

Complicating the matter, the existing rotor-swept area in the APWRA comprises a variety of turbine models, with a variety of operational status. The characteristics of existing turbines (including rotor-swept area) are provided in Appendix A-2, *Existing Turbines in the Altamont Pass Wind Resource Area*, of the PEIR. The rotor-swept areas of proposed repowered turbines are described in *Fourth-Generation* on page 2-4 of the Draft PEIR.

Moreover, an analysis of *all* metrics that *could* affect bird and bat fatality would bring the PEIR into the realm of speculation, and pursuant to CEQA Guidelines Section 15145 is beyond the scope of this document. Accordingly, the County believes that no additional analysis regarding comparison of rotor-swept area is necessary.

E.6 General Public

GP-1—Robert Cooper

To: Sandy Rivera
From: Robert Cooper, 4000 Dyer Rd., Livermore, CA (bobcooperhorse@gmail.com)
Subject: APWRA Comments
Date: 6/30/2014

Please include my comments in the APWRA EIR. Thanks.

- I support the repowering of the Altamont wind resource because it may reduce the avian kill and because many of the second generation wind turbines are still in service way beyond their designed lifetime. They are decrepit! The fourth generation wind turbines eliminate many problems with earlier technologies. 1

- For approval of such large repowering projects as Golden Hills and Patterson Pass, an appropriately large amount of land should be covered by a conservation easement as mitigation. Such conservation easements were created for mitigation of the Waste Management expansion and the Vasco Winds wind turbine project. The environment, plants, animals, insects, and birds deserve protection from future disruptive projects on some land. As noted in the DEIR, there are four future wind turbine projects, totaling 250 MW that will disrupt the environment. 2

- Siting of second-generation wind turbines west of Dyer Rd. residences has been problematic. In particular, wind turbines are located approximately 800' from the Mueller and Crocker homes, and 650' from a rental on the Walker Ranch. In the case of Mueller and Crocker, the wind turbines are about 400' above the homes as well. The elevation of the wind turbines above the Walker rental is substantial. 3

  To me, this seems too close though I do not know what the setback requirements were when the wind turbines were installed in the late 1980's. With the setbacks in the DEIR and the much, much taller wind turbines to be used in the repowering, wind turbines will be prohibited on most of the ridge line to the west of Dyer Rd. homes.

  Taking information from 2.3.1, Turbine Types, Fourth Generation, the THH ranges from 400' (262+135) to 520' (315+205). The houses near Dyer Rd. are at 800' elevation and the west ridge is at 1200' elevation, a difference of 400' which requires an addition 40% setback. The setbacks range from 1360' (1200+160) for small wind turbines to 1768' (1560+208) for large.

  Most of the wind turbines west of my house (4000 Dyer Rd.) are closer than 1360 ft. Further north, one of the Walker Ranch rentals is only 650' from the closest windmill. Further south, the houses are closer to the ridgeline than mine.

- Figure 1-2, Program Area: Multiple features are missing. All the residences on Dyer Rd. do not appear on the map. Also, Dyer Rd. does not appear on the map and should. There are 16 residences and rentals on Dyer Rd. and the Walker Ranch. There are three properties on Altamont Pass Rd. that are missing, from the Vieux's near the beginning of Dyer Rd. to the entrance of Waste Management. Also, there is a long string of wind turbines missing from this map. They are to the west of Dyer Rd. A Google map of the area is attached to help correct this situation. 4

GP-1—Robert Cooper

- Very predictable power outages occur on Dyer Rd. usually in the fall with the first rain. Dust that collects on the above ground power equipment short out with the addition of rain. Conversations with PGE confirm this regular occurrence. If repowering occurs on Dyer Rd., this problem should be fixed. Last outage occurred on June 26, 2014. 5
- In the DEIR velocity is given in meters per second. I suggest the document give velocity in both meters per second and miles per hour, a unit that is more familiar to most people in this country. (1 meter/sec = 2.23694 miles/hour) 6
- I have been concerned about the removal of wind turbines in the Dyer Rd. area, especially foundations. I have recently noticed that removal is taking place to the east of Dyer Rd. on Waste Management property. When removal of wind turbines occurs to the west of Dyer Rd. both the first and second-generation foundations must be removed. 7
- Section 3.1.2: Carroll Rd., which connects Altamont Pass Rd. with Flynn Rd. should be added to the list of roads. 8
- Hold a yearly public meeting to review avian kills attributed to wind turbines and measures that wind power companies are taking to reduce kills or mitigate. 9
- Considering that a home burned to the ground last year on Dyer Rd., special attention should be given to clearing grass and brush from all work areas during the fire season. An adequate number of fire extinguishers must be available at the work site. When the house burned on Dyer Rd., the response time from CalFire was a disappointing 30 minutes. 10
- Though the rotational speed of new wind turbines is much slower that the old turbines. The longer blade length makes the tip-of-blade speed of new and old turbines roughly comparable. YouTube video clips show cases of slow rotating long bladed turbines killing eagles: https://www.youtube.com/watch?v=8NAAzBArYdw 11
- Page 3.4-118: "Discourage prey for raptors" is an idea that is amusing for residents in the Altamont. A major prey for raptors is the ground squirrel. Please let us know how to discourage ground squirrels, which are exceedingly common in the Altamont. We will gladly help. 12

GP-1—Robert Cooper

Missing Features on Figure 1-2

E.6.1 Comment Letter GP-1—Robert Cooper

Response to Comment GP-1-1

The commenter's support of APWRA repowering is acknowledged.

Response to Comment GP-1-2

The commenter expresses his support for the creation of large conservation easements as mitigation. Conservation easements are included in the Draft PEIR as one of a menu of mitigation options for implementation by the County in Mitigation Measure BIO-11h.

Response to Comment GP-1-3

The County generally concurs with the estimated distances indicated by the commenter, but has determined that the maximum difference in elevation between the residences and the turbines is no more than 300 feet. The County's Standard Windfarm Conditions, adopted in late 1983, required a minimum *safety* setback of a turbine from a dwelling unit of 500 feet, or three times the total height of the windmill (to the topmost reach of the windmill blade), or four times the windmill height if its height were two or more times the height of the windmill above the dwelling unit. A separate *noise* setback condition disallowed turbines from being less than 1,000 feet from a residence "in an upwind direction (generally southwesterly to west-southwesterly), nor closer than 300 feet in any other direction…" This condition also allowed the setback to be reduced by up to 50% if a "written, notarized and recorded concurrence of the affected property owner is filed with this record." Other noise setback conditions provided a procedure to investigate and resolve reasonable noise complaints.

The existing turbines on this ridgeline are estimated to be no more than 110 feet tall, and therefore would only have had to satisfy the minimum setback of 500 feet, even if the setback were based on four times the turbine height. Although some of the turbines are less than 1,000 feet in an upwind direction from some Dyer Road residences (as currently required by the *noise* setback), it appears that these turbines on the ridge west of Dyer Road were approved in August 1983 or as early as 1981 (Conditional Use Permits C-3989, C-4383 and C-4325), before the noise setbacks were established (December 1983).

Although further research into the history of the turbines' approval, the construction dates of the residences, and other matters could be informative, the commenter is understood to be more concerned about the placement of new turbines on this ridgeline in the future. As shown in Table 2-2 in the Draft PEIR, new turbines will continue to be required to provide a setback equal to three times the turbine height, and 10% of total turbine height in additional setback per 100 feet of "elevation differential," unless there is a notarized agreement or an easement recorded on the affected property, and approved by the Planning Director. Table 2-2 on page 2-13 of the Draft PEIR has been updated to provide more clarity, such as to provide for a measurable setback increase for elevation differences of tens of feet, not just units of one hundred feet, as may have appeared the case. Please refer to Response to Comment LA-1-21 for the revised table.

Response to Comment GP-1-4

Figure 1-2 has been revised in response to the comment regarding identification of residences in the figure and is included here and in Chapter 1 of the Final PEIR.

Response to Comment GP-1-5

The commenter expresses concern about existing power outages. Because this comment is not directed to the analysis of environmental effects of the proposed projects or program, no response in this document is appropriate.

Response to Comment GP-1-6

The commenter requests that wind velocity in the PEIR be presented in miles per hour rather than meters per second. Wind velocity is commonly expressed in meters per second; this unit of measurement is the industry standard for wind energy technology. The commenter presents a conversion factor to convert meters per second to miles per hour.

Response to Comment GP-1-7

As noted in on pages 2-11 and 2-12 in Section 2.45, *Site Reclamation*, of the Draft PEIR, the 2005 CUPs required that wind companies remove all facilities and restore properties to preinstallation conditions if windfarm operations cease, unless the resource agencies (i.e., USFWS and CDFW) require that the facilities be left in place. Agency staff have indicated that in some cases the habitat disturbance involved in facility removal may outweigh the benefit of removing foundations. In such cases, the County Planning Department may see fit to waive these reclamation requirements, particularly where reclamation activities could have adverse effects on water quality (through erosion) or special-status species (such as disruption of suitable habitat for burrowing owls, California tiger salamanders, or California red-legged frogs).

Response to Comment GP-1-8

Comment noted. While Carroll Road does indeed traverse a portion of the program area, it is not a County-designated scenic route as specified in the Scenic Route Element of the County's General Plan. The list on page 3.1-4 in Section 3.1.2 of the Draft PEIR to which the commenter refers only lists those roads in the program area that are identified in the Scenic Route Element.

Response to Comment GP-1-9

The commenter states that yearly public meetings should be held to review avian kills attributed to wind turbines and measures to reduce or mitigate kills. As noted in Master Response 6, the County will establish a TAC for the purpose of reviewing proposed monitoring and mitigation plans, fatality monitoring reports, and adaptive management plans. The TAC meetings will be open to the public.

Response to Comment GP-1-10

The commenter raises the issue of fire safety during operation of wind energy generation projects. Fire safety is addressed in Section 3.8, *Hazards and Hazardous Materials*, of the Draft PEIR, and specifically in Impact HAZ-8a-1, HAZ-8a-2, HAZ-8b, and HAZ-8c.

Response to Comment GP-1-11

The issue of turbine-related avian mortality is addressed in detail in Section 3.4, *Biological Resources*, of the Draft PEIR.

Response to Comment GP-1-12

The commenter remarks on the abundance of ground squirrels in the APWRA. The intention of Mitigation Measure BIO-11f is only to discourage prey in the area surrounding turbines through placing gravel around the tower foundations and placing boulder piles away from the turbines. California ground squirrels provide essential burrow habitat for many special-status and common wildlife species and are an important prey item for various raptors and mammals. No revisions to the PEIR are necessary.

GP-2—Altamont Winds, LLC

Altamont Winds LLC

21 July 2014

Alameda County Community Development Agency
Planning Department
224 West Winton Avenue
Hayward, California 94544
sent via e-mail to sandra.rivera@acgov.org

Attention: Ms. Sandra Rivera, Assistant Planning Director

Subject: Comments to the Draft Programmatic Environmental Impact Report, Altamont Pass Wind Resource Area Repowering

Dear Sandi:

Altamont Winds LLC (**"AW")** appreciates the opportunity to provide comments on the Draft Programmatic Environmental Impact Report (**"DPEIR"**) for the Altamont Pass Wind Resource (**"APWRA"**) repowering. AW is the developer of the Summit Wind repower project, to be located entirely within the Alameda County portion of the APWRA. Our comments are as follows:

1. The DPEIR must include a quantitative evaluation of wind energy benefits to fully inform decision makers of the environmental effects of the repowering program. 1

While the County has often remarked on its recognition and appreciation of the importance of wind energy as a source of clean energy, the benefits of wind energy, for all practical purposes, have been ignored in APWRA permitting processes. Put more specifically, there has never been an accounting for wind energy benefits in the environmental impacts calculus undertaken in regard to wind farm permitting in Alameda County. As a result, wind energy facilities in Alameda County are required to undertake the same mitigation measures that a project of similar scale, yet devoid of similar environmental benefits, would be required to undertake.

AW believes that the DPEIR must present, in a real and quantifiable manner, the benefits of each repowered APWRA wind energy facility, including the impacts of clean, renewable wind energy on wildlife. These benefits must also be considered and factored into the mitigation calculus of the DPEIR and subsequent project specific Environmental Impact Reports tiering off the DPEIR.

1

15850 Jess Ranch Road, Tracy, California 95377
phone 925.455.7251 • e-mail ajr@powerworks.com • www.powerworks.com

GP-2—Altamont Winds, LLC

The best available evidence on the quantification of avian health benefits resulting from air pollution offsets attributable to APWRA wind farms is the McCubbin and Sovacool Study, *Health, Wildlife And Climate Benefits Of The 580 MW Altamont Winds Farm*. The relevant results of the Study have been cited in peer-reviewed journals, including, most recently, the Journal of Integrative Environmental Sciences.[1] See study attached as Exhibit 1. 1 cont.

Compared to natural gas power plants operating in the area the Altamont Pass, the 417 MW project area analyzed in the DPEIR would offset over 1.7 billion pounds of greenhouse gases and harmful fine particulate matter each year of operation. Over twenty years, it is estimated that taking this pollution out of the air will prevent over two thousand instances of cardio-pulmonary illness and premature mortality. Over that same period, nearly 60,000 avian fatalities due to air pollution and climate change will also be avoided. The wind farms need no fuel or water to generate electricity, which, compared to locally operating natural gas power plants, will save over 4 billion cubic feet of natural gas and 346 million gallons of water per year of wind farm operation.

The DPEIR should be amended to explicitly allow for consideration of quantitative benefits of wind energy, particularly the benefits of wind energy on birds, as defined in the CEQA guidelines.

2. The DPEIR must set forth reasonable shadow flicker impact thresholds and mitigation measures 2

Impact AES-5a-1 and Mitigation Measure AES-5 of the DPEIR indicate that any degree of shadow flicker is per se a significant impact requiring mitigation to reduce that impact to a less than significant level. Specifically, the DPEIR mandates that no turbine will be allowed to be sited in a location where preconstruction modelling indicates that a residence or business will be exposed to 30 minutes per day or 30 days per year of shadow flicker. Furthermore, the DPEIR requires that any exposure to shadow flicker within those limitations must be mitigated.

AW does not agree that Impact AES-5a-1 sets a reasonable threshold of significance, nor does AW believe that mitigation is warranted for de minimus exposure to shadow flicker.

Modern wind turbines are prone to create shadow flicker because they are significantly larger than previous generations of wind turbines. By increasing turbine height and rotor diameter, each turbine can produce more clean energy for more hours of the year and at lower wind speeds, all while reducing the risk of collision to avian wildlife. In fact, it is precisely these benefits of larger turbine design that are compelling repowering in the Altamont Pass. If, however, the County establishes guidelines that disqualify large wind turbines on the basis of their height from being installed in certain areas, as the shadow flicker portions of the DPEIR inadvertently do, then the County is inadvertently undermining the benefits of repowering and underutilizing a State- and County-designated wind resource without adequate justification.

[1] Sovacool, BK. "The Avian and Wildlife Costs of Fossil Fuels and Nuclear Power," ***Journal** of Integrative Environmental Sciences* 9(4) (December, 2012), pp. 255-278; *see also* McCubbin, D and BK Sovacool. "The Hidden Factors That Make Wind Energy Cheaper than Natural Gas in the United States," *Electricity Journal* 24(9) (November, 2011), pp. 84-95; Sovacool, BK. "The Avian Benefits of Wind Energy: A 2009 Update," *Renewable Energy* 49 (January, 2013), pp. 19-24; McCubbin, D and BK Sovacool. "Quantifying the Health and Environmental Benefits of Wind Power to Natural Gas," *Energy Policy* 53 (February, 2013), pp. 429-441.

2

15850 Jess Ranch Road, Tracy, California 95377
phone 925.455.7251 • e-mail ajr@powerworks.com • www.powerworks.com

GP-2—Altamont Winds, LLC

Therefore, AW believes that a sensible revision is warranted for the DPEIR's treatment of shadow flicker impacts. 2 cont.

First, based on a thorough survey of available data on global shadow flicker exposure standards, AW recommends that the appropriate threshold of significance for shadow flicker is exposure to a residence in excess of 30 minutes within a 24-hour period or 30 hours per year. (This is in contrast to 30 days per year of any length of shadow flicker, as stated in the DPEIR). Any exposure to shadow flicker below this threshold should be considered less than significant.

Second, where preconstruction analysis predicts shadow flicker in excess of this threshold, mitigation measures that may be required to reduce shadow flicker exposure at a given residence to less than 30 hours per year should include:

1. micro-siting wind turbines to reduce shadow flicker exposure at an affected residence;

2. obtaining a waiver of impacts from affected residents;

3. putting in place physical barriers, at the wind operator's expense, such as vegetative plantings, window blinds or curtains, or window awnings, with the understanding that installation of any physical barriers to be made on the affected landowner's property would require consent to such installations by the landowner; or,

4. in the event the above mitigation measures are insufficient to reduce shadow flicker exposure to less-than-significant levels, operational changes, such as, temporary curtailment during periods of shadow flicker exposure, may be required.

3. DPEIR section Impact AES-2 and Mitigation Measure AES-2a concerning visually sensitive areas should clearly state that a turbine site is "new" only in those areas not previously developed with wind turbines, regardless of whether turbines presently operate at that location. 3

Citing a number of policies announced in the East County Area Plan (**ECAP**"), the County states in the DPEIR section on aesthetic impacts that "the County would be obligated to disallow new turbine structures from being located in [visually sensitive] areas," (DPEIR 3.1-15, emphasis added) and that, "[f]or those areas with existing older turbines, the replacement of the many existing smaller and older turbines with proportionally far fewer and less intrusive fourth-generation turbines would serve Policies 170 and 215 of the East County Area Plan, and serve to protect and enhance scenic values." (DPEIR pg. 3.1-16). Further, the DPEIR at Mitigation Measure AES-2a (DPEIR 3.1-16) states that new turbines will be disallowed, except "along ridgelines that have not previously been developed with wind turbine strings," unless certain conditions are shown.

For the avoidance of doubt, the DPEIR should clarify that where new turbines are installed along ridgelines that have previously been developed with wind turbine strings, even where such old-generation turbines have been removed, the visual impact is less than significant for purposes of all Alameda County policies related to preserving visually sensitive view sheds.

This interpretation of the County policies seems the only reasonable interpretation given the unique attributes of the APWRA. For instance, turbines have been continually removed from ridgelines along the Altamont Pass for decades and for differing reasons. It would be arbitrary

3

15850 Jess Ranch Road, Tracy, California 95377
phone 925.455.7251 • e-mail ajr@powerworks.com • www.powerworks.com

GP-2—Altamont Winds, LLC

to choose some point in time at which a ridgeline's visual sensitivity is deemed to be restored, and indeed the County makes no attempt to do so. Further, developers may be repowering in an area where they do not presently operate wind turbines and thus have no control over another company's decision to maintain or remove existing structures. 3 cont.

More generally still, it is important that the County maintain an overall balance of interests in assessing the visual impacts of proposed wind farms in the Altamont Pass. To interpret the ECAP policies strictly would be to unintentionally foreclose any wind development in the APWRA, which is one of only three designated wind resource areas in California. Consider that the many public roads and trails through and along the APWRA are at elevations that offer expansive views across vast swaths of the Altamont Pass. Prohibiting structures, particularly tall structures that must be sited atop ridgelines, simply because they can be seen from a public hiking trail, would run counter to the goals of the ECAP. Given the County's stated goal of "maximize[ing] the production of wind generated energy and" its policy to allow for the continued operation and redevelopment of existing wind farm facilities (ECAP Policy 169, cited in the DPEIR at 3.1-7), the County must take a permissive approach when interpreting visual impacts policies.

4. The raptor conservation measures mitigation increment should be shortened to five years or less. 4

Suggested in Mitigation Measure BIO-11h are a number of compensatory mitigation measures for the loss of raptors, including eagles. According to this measure as outlined in the DPEIR (Section 3.4-108), compensatory mitigation is to be provided in ten-year increments based on the number of estimated fatalities. This mitigation increment should be shortened to bring it in line with current mitigation increments being suggested by other agencies and avian monitoring programs and in order to reduce the financial and functional burdens a ten-year increment places on wind developers.

The U.S. Fish and Wildlife Service (**"USFWS"**), in the recently announced, first-of-its-kind Eagle Take Permit granted to a wind farm in California, required mitigation based on projected avian take to be paid in five-year increments. The County requirement set forth in the DPEIR should not exceed the five-year standard presently being utilized by this Federal agency. Introducing the possibility for disparity between regulators invites confusion and potential conflict in terms of funding logistics and monitoring obligations. Without justification, the County's requirement for a ten-year increment seems arbitrary and unreasonable.

A ten-year mitigation increment also imposes a significantly greater burden on operators as compared to a five-year mitigation increment, for a number of reasons. First, in economic terms, doubling the increment requires doubling the upfront compensatory payment, which affects the feasibility of projects operating on already thin margins. The ten-year increment will also reduce funds available for investment in developing new conservation measures and strategies.

Second, an extended mitigation increment could lock operators into ineffective or unworkable mitigation schemes. This is of particular concern where, at least for the first of these increments, the conservation and mitigation program will be designed with no project-specific monitoring data to support the program.

4

15850 Jess Ranch Road, Tracy, California 95377
phone 925.455.7251 • e-mail ajr@powerworks.com • www.powerworks.com

GP-2—Altamont Winds, LLC

AW appreciates that the DPEIR acknowledges the evolving nature of avian conservation and mitigation strategies and seeks to induce operators to invest in new measures to reduce avian fatalities at wind farms. Yet the imposition of a ten-year commitment to a conservation and mitigation program ensures that it will be difficult to alter a mitigation strategy to make it more effective until ten years has elapsed (unless one undertakes what is surely to be a lengthy and potentially adversarial modification process). 4 cont.

Please contact us if you have any questions.

Sincerely,

Altamont Winds LLC

Andrew J. Roth
General Counsel

5

15850 Jess Ranch Road, Tracy, California 95377
phone 925.455.7251 • e-mail ajr@powerworks.com • www.powerworks.com

E.6.2 Comment Letter GP-2—Altamont Winds, LLC

Response to Comment GP-2-1

The County agrees that wind energy has benefits; however, it is not the purpose of the PEIR to demonstrate the benefits of wind energy. Moreover, the referenced report does not address the impacts of the proposed program or projects. Finally, the benefits of cleaner air to the resources addressed in the PEIR are not quantifiable, nor do they relate directly to the issues evaluated under CEQA; consequently, indirect benefits cannot be considered to offset potential direct impacts.

Response to Comment GP-2-2

The commenter states that Impact AES-5a-1 and Mitigation Measure AES-5 must set forth reasonable shadow flicker impact thresholds and mitigation measures and that measures to restrict turbine installation based on height would undermine the advantages of repowering. The commenter recommends that the appropriate threshold of significance for shadow flicker is exposure to a residence in excess of 30 minutes within a 24-hour period or 30 hours per year, in contrast to 30 days per year of any length of shadow flicker. The County has determined that the 30-minute/30-day threshold was ambiguous and open to misinterpretation. Accordingly, Mitigation Measure AES-5 has been revised as shown below.

The commenter also states that the measure include micro-siting, the option for residential waivers, provision of window awnings and landscaping, and operational curtailments to reduce flicker effects. Mitigation Measure AES-5 already contains measures to adjust turbine siting and operational curtailments to reduce flicker affects. Opaque window coverings are also included, but the measure has been revised to include awnings and landscaping to be provided by the applicant. Obtaining a waiver of impacts from affected residents is not mitigation under CEQA. To address these comments, the text of Mitigation Measure AES-5 on page 3.1-28 of the Draft PEIR has been revised as shown below.

Mitigation Measure AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker

~~Shadow~~ Where shadow flicker could result from the installation of ~~taller~~ wind turbines ~~that could be sited~~proposed near residences (i.e., within 500 meters [1,640 feet] in a generally east or west direction to account for seasonal variations), ~~residents and businesses. Accordingly, Alameda County will require that~~ the project applicant will prepare a graphic model and study to evaluate shadow flicker impacts on nearby ~~(i.e., no more than 500 meters from the subject turbine)~~ residences ~~and businesses~~. No shadow flicker in excess of 30 minutes in a given day or 30 ~~days~~ hours in a given year will be permitted. If it is determined that existing setback requirements as established by the County are not sufficient to prevent shadow flicker impacts on residences ~~and businesses~~, Alameda County will require an increase in the required setback distances to ensure that residences ~~and businesses~~ are not affected. If any residence ~~or business~~ is affected by shadow flicker within the 30-minute/30-~~day~~hour thresholds, the applicant will implement measures to minimize the effect, such as relocating the turbine~~, ;~~ providing opaque window coverings, window awnings, landscape buffers, or a combination of these features to reduce flicker to acceptable limits for the affected receptor~~,~~; or shutting down the turbine during the period shadow flicker would occur. Such measures may be undertaken in consultation with owner of the affected residen~~t or business owner~~ce. If the shadow flicker study indicates that any given turbine would result in shadow flicker exceeding the 30-minute/30-~~day~~ hour thresholds and the property owner is not amenable to window coverings, window awnings, or landscaping and the turbine cannot be shut down during the period of shadow flicker, then the turbine ~~would~~ will be relocated to reduce the effect to acceptable limits.

The following citation has been added to the Section 3.1.4, *References Cited*, in Section 1.3, *Aesthetics*, of the Final PEIR.

Department of Energy and Climate Change. No date. *Update of UK Shadow Flicker Evidence Base*. Final report. Prepared by Parsons Brinckerhoff, Newcastle Upon Tyne, UK.

Response to Comment GP-2-3

The commenter states that Impact AES-2 and Mitigation Measure AES-2a concerning visually sensitive areas should clearly state that a turbine site is "new" only in those areas not previously developed with wind turbines, regardless of whether turbines presently operate at that location. The commenter feels that Alameda County policies should be interpreted to indicate that visual impacts would be less than significant where new turbines are installed along ridgelines that have previously been developed with wind turbine strings, even where such old-generation turbines have been removed, because of the attributes of the APWRA and the County's goal to maximize wind production energy.

In preparation of the PEIR, the County interprets and analyzes applicable regulations and policies as written. Policy 105 of the ECAP lists the ridgelines above Vasco Road and the ridgelines surrounding Brushy Peak north of Livermore as sensitive viewsheds and states that the County shall preserve these visually sensitive ridgelines "largely in open space use." Policy 106 states that:

> Structures may not be located on ridgelines or hilltops or where they will project above a ridgeline or hilltop as viewed from public roads, trails, parks and other public viewpoints unless there is no other site on the parcel for the structure or on a contiguous parcel in common ownership on or subsequent to the date this ordinance becomes effective. New parcels may not be created that have no building site other than a ridgeline or hilltop, or that would cause a structure to protrude above a ridgeline or hilltop, unless there is no other possible configuration.

Policy 107 states that "The County shall permit no structure (e.g., housing unit, barn, or other building with four walls) that projects above a visually-sensitive major ridgeline." As written, these policies can be interpreted to suggest that the County has determined that past planning measures did not protect visually sensitive ridgelines and has accordingly set forth these policies to establish this protection. However, at this time and as described in the Draft PEIR, no turbines are proposed to be sited in the areas described in this comment as being of concern. The County has not undertaken studies that would support identification of specific areas where turbine development should be prohibited. As stated in Policy 106, siting of structures should not occur "unless there is no other site on the parcel for the structure or on a contiguous parcel in common ownership on or subsequent to the date this ordinance becomes effective." This provision does not negate the impact or mean that the impact is less than significant, based on County policies; however, the provision establishes the County's discretion to allow for such structures to be sited within areas identified as visually sensitive even if doing so would result in significant impacts. In addition, as described in detail in Section 1.1.2, *Program-Level Analysis and Tiering*, on page 1-1 of the Draft PEIR, specific projects proposed in the future would undergo project-level environmental analysis tiered from this PEIR.

Response to Comment GP-2-4

The commenter expresses the opinion that the period for calculating compensatory mitigation should be shorter than 10 years. The County selected the 10-year timeframe to provide more support for the acquisition of conservation lands, which can require substantial up-front costs. The amount actually required of the operators would be based on the actual impacts as described in the mitigation measure.

Please see also Response to Comment NGO-1-15.

GP-3—EDF Renewable Energy

EDF renewable energy

EDF Renewable Energy
4000 Executive Parkway, Ste 100
San Ramon, CA 94583
T : 925.242.0168

July 21, 2014

Sandra Rivera
Assistant Planning Director, Alameda County
224 West Winton Avenue, Rm. 111
Hayward, CA 94544

Re: Altamont Pass Wind Resource Area Repowering Draft PEIR

Dear Ms. Rivera:

Thank you for the opportunity to provide comments on the Altamont Pass Wind Resource Area Repowering Draft Program Environmental Impact Report. We request that you consider the following comments in preparing the Final EIR.

Mitigation Measure AQ-2b on page 3.3.36 calls for a suspension of excavation, grading and excavation activities when wind speeds exceed 20 mph. We request that the County adjust this requirement to 25 mph and also designate the Livermore Municipal Airport as the location where wind speed is measured. Wind energy is generated in the Altamont Pass Wind Resource Area (APWRA) because of the windy conditions. Suspending construction during conditions that are considered to very windy elsewhere, but not very windy in the APWRA, would impede prompt completion of construction activities. Designating the nearest commercial airport, here the Livermore Municipal Airport, as the location for measuring wind speed would make it is easier for both the County and the wind companies and their construction contractors to adhere to this measure. 1

Mitigation Measure BIO-11c on page 3.4-104 calls for a no less than 95 foot differential between the ground surface and the lowest point of the turbine blade (the tip of the blade in the 6:00 position.) Some of the blades on the larger, state of the art turbines (such as the Vestas 3.3 MW turbine) are, for example, approximately 92 feet from the ground surface. To allow greater flexibility in turbine choice and, in particular, to allow use of fewer larger turbines, which recent research demonstrates results in lower avian mortality than use of more, smaller turbines, we request that the County allow a distance of no less than 90 feet between the ground surface and the tip of the blade. 2

Mitigation Measure AQ-2b on page 3.3-36 and Mitigation Bio-2 on page 3.4-61 call for washing of trucks and equipment prior to leaving the site. We suggest that the requirement to wash trucks be deleted because of the extreme drought that California is currently experiencing and because the requirement to water roadways and install dust control zones (i.e. wood chips, rock, etc., which are designed to dislodge dust and dirt from vehicles driven over them) at all site access points is sufficient to control dust on vehicles and tires. 3

We appreciate your attention to these comments and look forward to working with you to finalize the EIR. This Program EIR will facilitate the repowering of wind projects in the

www.edf-re.com

GP-3—EDF Renewable Energy

edf renewable energy

EDF Renewable Energy
4000 Executive Parkway, Ste 100
San Ramon, CA 94583
T : 925.242.0168

APWRA and result in a reduction of avian mortality as well as a continued source of zero emissions energy for California.

Sincerely,

Brian Sarantos
Project Manager

www.edf-re.com

E.6.3 Comment Letter GP-3—EDF Renewable Energy

Response to Comment GP-3-1

The commenter requests revising Mitigation Measure MM-AQ-2b to change the wind speed requirement from 20 mph to 25 mph and to designate the Livermore Municipal Airport as the location where wind speed is measured. The wind speed requirement identified in Mitigation Measure MM-AQ-2b is a standard BAAQMD mitigation requirement for projects with construction emissions in excess of their significance thresholds. The text in the second bullet of Mitigation Measure AQ-2b on page 3.2-26 of the Draft PEIR has been revised in response to this comment as shown below.

- All excavation, grading, and/or demolition activities will be suspended when average wind speeds exceed 20 mph, as measured at the Livermore Municipal Airport.

Response to Comment GP-3-2

The commenter suggests that Mitigation Measure BIO-11c on page 3.4-104 of the Draft PEIR be revised to reduce the lowest point of the turbine blade. The County considered this comment and reviewed the available information, as well as comment LA-2-50 from the Scientific Review Committee on the same topic. Based on input from the SRC, the County agrees that because the measure in the Draft PEIR was based on a single study in a different WRA, it is not necessarily applicable to the APWRA. Consequently, Mitigation Measure BIO-11c has been revised as shown in Response to Comment LA-2-50.

Response to Comment GP-3-3

The commenter requests a change to the mitigation included in Mitigation Measure MM-AQ-2b, which also addresses Impact BIO-2. The truck washing described in the mitigation measure is a standard measure that addresses both dust impacts and noxious weed impacts. For this reason, a substitute measure as described by the commenter would not address the impacts identified in the PEIR. Measures such as containing and recycling wash water may be available to reduce water use at specific job sites.

GP-4—Golden Hills, LLC

GOLDEN HILLS WIND, LLC
JULY 21, 2014

TABLE 1

DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT: COMMENTS FROM GOLDEN HILLS WIND, LLC

Comment No.	Section	Page	Draft PEIR Text	Proposed Changes to Text *(red font indicates edit previously provided to County)*	Notes/Comments to Alameda County	
Global edits/comments:						
1.	All text referring to Golden Hills project acreage.	2-25	The Golden Hills project area encompasses approximately 4,528 acres on 38 parcels.	The Golden Hills project area encompasses approximately ~~4,528~~ 4,580 acres on 38 parcels.	Please use revised project boundary shape files provided with this submittal for all figures depicting proposed Golden Hills project. The revised boundary falls within the scope of the original project analysis included in the Draft PEIR and does not result in an increase in any impacts beyond those disclosed in the Draft PEIR. No new significant environmental impacts would result from the project change and no new mitigation measures are proposed.	1
Project Description:						
2.	2.2.1	2-1	Windfarm uses have been permitted in the APWRA since the early 1980s with such CUPs, and the currently active CUPs (last approved in 2005 for continued operation of the windfarms, and amended in 2007) are set to expire in September 2018. Those CUPs mandated that the windfarm operators would repower their windfarms by that expiration date.	Windfarm uses have been permitted in the APWRA since the early 1980s with such CUPs, and the terms of the currently active CUPs (last approved in 2005 for continued operation of the windfarms, and amended in 2007) are ~~set to expire in~~ through September 2018. ~~Those CUPs mandated that the windfarm operators would repower their windfarms by that expiration date.~~	Comment provided to County on 3/17. The Draft PEIR has failed to respond to this comment. See suggested revised text.	2
3.	2.3.1 Turbine Types	2-3, 2-4.	In contrast, evaluation of mortality data collected at windfarms around the country (including in the APWRA) have suggested that current-generation turbines may lead to a substantial increase in bat	In contrast, evaluation of mortality data collected at windfarms around the country (including in the APWRA) have suggested that current-generation turbines may lead to a~~n~~ ~~substantial~~ increase in	Comment provided to County on 3/17. The Draft PEIR has failed to fully respond to this comment. "substantial" was previously	3

PAGE 1 OF 29

GP-4—Golden Hills, LLC

			mortality (Barclay et al. 2007). Moreover, because of the scarcity of valid comparative data, considerable uncertainty remains regarding the effects of repowering on avian and bat mortality.	bat mortality (Barclay et al. 2007). Moreover, because of the scarcity of valid comparative data, ~~considerable~~ uncertainty remains regarding the effects of repowering on avian and bat mortality.	"exponential" See suggested revision. These terms are not quantifiable and are subjective.	3 cont.
4.	2.4.5 Site Reclamation	2-11	Reclamation activities entail returning lands disturbed by infrastructure installation or removal to preproject conditions. Some facilities (e.g., roadways, turbine footings) may be left in place if doing so is deemed to be more protective of natural resources than removal. At each reclamation site, the entire site is contour graded (if necessary) to conform with the natural surrounding topography and reseeded with an appropriate seed mixture, unless the resource agencies request that contouring not be undertaken. No soil is removed from the site. Figure 2-9 shows reclamation of a turbine pad site. Exceptions to returning a site to preinstallation conditions may be made, upon approval of the County Planning Department, if such reclamation activities would or could create water quality issues (e.g., erosion) or if the activities may adversely affect special-status species (e.g., burrowing owl burrow complexes, upland habitat for California red-legged frog or California tiger salamander). Moreover, CDFW and USFWS have suggested that it may sometimes be preferable to avoid regrading roads or removing foundations to avoid disruption of such habitats. In such cases, the County Planning Department could change reclamation requirements accordingly.	Reclamation activities entail returning lands disturbed by infrastructure installation or removal to preproject conditions. Some facilities (e.g., roadways, turbine footings, <u>underground collection lines</u>) may be left in place if doing so is deemed to be more protective of natural resources than removal. At each reclamation site, the entire site is contour graded (if necessary <u>and environmentally feasible</u>) to conform with the natural surrounding topography<u>, stabilized,</u> and and reseeded with an appropriate seed mixture, unless the resource agencies request that contouring not be undertaken. No soil is removed from the site. Figure 2-9 shows reclamation of a turbine pad site. Exceptions to returning a site to preinstallation conditions may be made, upon approval of the County Planning Department, if such reclamation activities would or could create water quality issues (e.g., erosion) or if the activities may adversely affect special-status species (e.g., burrowing owl burrow complexes, upland habitat for California red-legged frog or California tiger salamander). Moreover, CDFW and USFWS have suggested that it may sometimes be preferable to avoid regrading roads or removing foundations to avoid disruption of such habitats. In such cases, the County	See suggested revision. Please use this standard language throughout PEIR and/or refer to Section.	4

GP-4—Golden Hills, LLC

				Planning Department could change reclamation requirements accordingly		
5.		2-17	Grading may be performed in some instances to match the surrounding contours, but it will be avoided where appropriate to minimize and avoid disturbance of wildlife burrows that have adapted to existing grade cuts. New grading over existing foundations, equipment pads, or finger roads may be necessary for the installation of new access roads and foundation pads for repowered turbines.	As described in Section 2.4.5, ~~G~~grading may be performed ~~in some instances to match the surrounding contours, but it will be avoided where appropriate to minimize and avoid disturbance of wildlife burrows that have adapted to existing grade cuts~~. New grading over existing foundations, equipment pads, or finger roads may be necessary for the installation of new access roads and foundation pads for repowered turbines.	Comments provided to County on 4/18. Draft PEIR failed to respond to comment. See suggested revisions. Since this is the Project Description, and subsection is describing existing wind turbine removal, specifics on when grading wouldn't occur doesn't necessarily add value to section and would potentially be confusing.	5
6.	Postconstruction Reclamation	2-23	As described in Section 2.4.4, the 2005 CUPs require that wind companies remove all facilities and restore properties to preinstallation conditions once the windfarm is decommissioned. .... Reclamation activities involve returning lands disturbed by infrastructure installation or removal to preproject conditions. At each reclamation site, the entire site is contour graded (if necessary) to conform to natural surrounding topography, stabilized, and reseeded with an appropriate seed mixture. No soil is removed from the site. Figure 2-9 shows reclamation of a turbine pad site. Exceptions to returning a site to preinstallation conditions may be made, with approval of the County Planning Department, if such reclamation activities would or could create water quality issues (e.g., erosion) or if the activities may adversely affect special-status species (e.g., burrowing owl burrow	As described in Section ~~2.4.4~~ 2.4.5, the 2005 CUPs require that wind companies remove all facilities and restore properties to preinstallation conditions once the windfarm is decommissioned. .... Reclamation activities involve returning lands disturbed by infrastructure installation or removal to preproject conditions. Some facilities (e.g., roadways, turbine footings, underground collector lines) may be left in place if doing so is deemed to be more protective of natural resources than removal. At each reclamation site, the entire site is contour graded (if necessary and environmentally beneficial) to conform to natural surrounding topography, stabilized, and reseeded with an appropriate seed mixture. No soil is removed from the site. Figure 2-9 shows reclamation of a turbine pad site. Exceptions to returning a site to preinstallation conditions may be made, with approval of the County	Comments provided to County on 4/18. Draft PEIR failed to respond to comment. See suggested edits. Revisions focused on consistency with language in Section 2.4.5.	6

GP-4—Golden Hills, LLC

			complexes, upland habitat for California red-legged frog or California tiger salamander). Roads that are not necessary after turbine removal and that are not wanted by landowners would also be reclaimed unless a resource agency (CDFW or USFWS) determines that reclamation would be detrimental to special-status species. In addition, some roads widened for construction may be returned to preproject widths and widened areas reclaimed. Road reclamation may include contour grading to conform to natural surrounding ground levels and backfilling road cuts on slopes.	Planning Department, if such reclamation activities would or could create water quality issues (e.g., erosion) or if the activities may adversely affect special-status species (e.g., burrowing owl burrow complexes, upland habitat for California red-legged frog or California tiger salamander). Roads that are not necessary after turbine removal and that are not wanted by landowners would also be reclaimed unless a resource agency (CDFW or USFWS) determines that reclamation would be detrimental to special-status species. <u>CDFW and USFWS have indicated that regrading of roads should be avoided in most cases to avoid disruption of such habitats. In such cases, the County Planning Department would limit reclamation activities to removal of pads, equipment, and overhead power lines, and would authorize reseeding but not regrading of existing road beds.</u> In addition, some roads widened for construction may be returned to preproject widths and widened areas reclaimed. Road reclamation may include contour grading to conform to natural surrounding ground levels and backfilling road cuts on slopes.		6 cont.
7.	Table 2-3, line 2	2-25	99A-1760-1-4[a]	~~99A-1760-1-4[a]~~	Please delete from table. No acreage is identified for this parcel, and this parcel is not within project boundary.	7
8.	2.6.1	2-27	Golden Hills would likely select a turbine with characteristics similar to those of the GE 1.7 XLe model: a 1.7 MW turbine with a hub height of 80–96 meters (262–315 feet), a	Golden Hills would likely select a turbine with characteristics similar to those of the GE 1.7 XLe model: a 1.7 MW turbine with a hub height of 80–96 meters (262–315 feet), a	A tower with a hub height of 80 meters and rotor diameter of 100 meters, would have a minimum distance from ground to rotor tip of 30 meters (98	8

GP-4—Golden Hills, LLC

			rotor diameter of 100–115 meters (328–377 feet), a total height up to 153 meters (502 feet), and a minimum distance from ground to rotor tip at 6:00 position of 38 meters (125 feet).	rotor diameter of 100–115 meters (328–377 feet), a total height up to 153 meters (502 feet), and a minimum distance from ground to rotor tip at 6:00 position of ~~38~~ 30 meters (~~125~~ 98 feet).	feet). Dimensions provided in DEIR are for tower with 96 meter hub height and 115 meter rotor diameter (larger model).	8 cont.
9.	Golden Hills - Existing Facilities	2-27	Existing roads and other disturbed areas not needed for the proposed project's new turbines would be decommissioned and recontoured, as appropriate, to maintain slope stability. Following recontouring, surface soils would be prepared for planting and revegetated with seed stock. Temporary erosion control measures would be implemented to maintain topsoil and revegetation.	As described in Section 2.4.5, ~~e~~Existing roads and other disturbed areas not needed for the proposed project's new turbines would be decommissioned ~~and recontoured,~~ contour graded (if necessary and environmentally beneficial), stabilized and reseeded with an appropriate seed mix, ~~as appropriate~~ to maintain slope stability. ~~Following recontouring, surface soils would be prepared for planting and revegetated with seed stock.~~ Temporary erosion control measures would be implemented to maintain topsoil and revegetation.	Comments provided to County on 4/18. Draft PEIR failed to respond to comment. See suggested edits.	9
10.	Collector Substation	2-30	Modular battery storage unit(s) could be installed within enclosed structures located within the proposed facility's substation area. The units would be inspected and maintained on an as-needed basis, in accordance with the facility's operational requirements and applicable regulations.	Modular battery storage unit(s) could be co-located to ~~installed within enclosed structures located within~~ the proposed facility's substation area. The units would be inspected and maintained on an as-needed basis, in accordance with the facility's operational requirements and applicable regulations.	Please see Attachment 1 for a description of the battery storage. Please revise PEIR description with this supplemental information.	10
11.	Golden Hills - Construction Staging Areas	2-33	Following completion of construction activities, the contractor would restore the temporary construction staging areas. The gravel surface would be removed and the areas would be recontoured, stockpiled topsoil would be replaced, and the area would be seeded with an approved mixture of grasses.	Following completion of construction activities, the contractor would restore the temporary construction staging areas. The gravel surface would be removed and the areas would be contour graded (if necessary and environmentally beneficial) to conform with the natural topography, stabilized and reseeded ~~recontoured, stockpiled topsoil would be replaced, and the~~	Comments provided to County on 4/18. Draft PEIR failed to respond to comment. See suggested edits.	11

GP-4—Golden Hills, LLC

				~~area would be seeded~~ with an ~~approved~~ appropriate seed mixture ~~of grasses~~.		11 cont.
12.	Roadway Improvements.	2-43	Improvements to Patterson Pass Road (straightening, widening, or improving the turn into the project area) may be necessary to facilitate the delivery of turbines and associated parts. These improvements would be undertaken within the existing County right of way and/or within the project area, which abuts Patterson Pass Road. Improvements to Jess Ranch Road (widening the existing turn) may also be required to facilitate the turn into the project area.	Improvements to public and private roads ~~Patterson Pass Road~~ (straightening, widening, or improving the turn into the project area) may be necessary to facilitate the delivery of turbines and associated parts. These improvements would be undertaken within the existing County right of way and/or within the project area~~, which abuts Patterson Pass Road. Improvements to Jess Ranch Road (widening the existing turn) may also be required to facilitate the turn into the project area~~.	Comment provided on 3/17. Draft PEIR failed to respond to comment. See suggested edit.	12
Aesthetic Resources						
13.	3.1.2	3.1-9	The northernmost portion of the project area, just south of I-580, is characterized by rolling, grassy terrain with turbines, transmission lines, and access roads. In addition to the turbines, this area is dotted with industrial facilities, residences, and stock ponds. The area is also characterized by steep cuts in the hills throughout to accommodate Jess Ranch Road, Flynn Road, and the railroad tracks.	The northernmost portion of the project area, just south of I-580, is characterized by rolling, grassy terrain with turbines, transmission lines, and access roads. In addition to the turbines, this area is dotted with industrial facilities, residences, and stock ponds. The area is also characterized by steep cuts in the hills throughout to accommodate ~~Jess Ranch Road,~~ Flynn Road, and the railroad tracks.	Comment provided via email on 3/25. Draft PEIR failed to respond to comment. Please delete reference to Jess Ranch Rd. .	13
14.	3.1.2 Table ES-1	3.1-20	**MM AES-3: Do not construct turbines on the undeveloped portion of the Golden Hills project area along Flynn Road** In order to comply with Policy 170 of Alameda County's East County Area Plan, and to prevent significant impacts on visual character, no turbines will be located on the undeveloped portion of the Golden Hills project area		This MM was discussed during the 3/13/14 meeting, and per that discussion between NextEra and County, please delete.	14

GP-4—Golden Hills, LLC

			along Flynn Road (Figure 3.1-2).			14 cont.
15.	3.1.2 Table ES-1	3.1-27	**Mitigation Measure AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker.** Shadow flicker could result from the installation of taller wind turbines that could be sited near residents and businesses. Accordingly, Alameda County will require that the project applicant model and evaluate shadow flicker impacts on nearby residences and businesses. No shadow flicker in excess of 30 minutes in a given day or 30 days in a given year will be permitted. If it is determined that existing setback requirements as established by the County are not sufficient to prevent shadow flicker impacts on residences and businesses, Alameda County will require an increase in the required setback distances to ensure that residences and businesses are not affected. If any residence or business is affected by shadow flicker within the 30-minute/30-day thresholds, the applicant will implement measures to minimize the effect, such as relocating the turbine, providing opaque window coverings for the affected receptor, or shutting down the turbine during the period shadow flicker would occur. Such measures may be undertaken in consultation with the affected resident or business owner. If the shadow flicker study indicates that any given turbine would result in shadow flicker exceeding the 30-minute/30-day thresholds, the turbine would be relocated to	**Mitigation Measure AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker.** Shadow flicker could result from the installation of taller wind turbines that could be sited near residents and businesses. Accordingly, Alameda County will require that the project applicant model and evaluate shadow flicker impacts on nearby residences and businesses. Upon complaint from affected residence, the Applicant will conduct shadow flicker study and if warranted, may be required to reduce shadow flicker through operational adjustments to avoid potentially significant impact. ~~No shadow flicker in excess of 30 minutes in a given day or 30 days in a given year will be permitted. If it is determined that existing setback requirements as established by the County are not sufficient to prevent shadow flicker impacts on residences and businesses, Alameda County will require an increase in the required setback distances to ensure that residences and businesses are not affected. If any residence or business is affected by shadow flicker within the 30-minute/30-day thresholds, the applicant will implement measures to minimize the effect, such as relocating the turbine, providing opaque window coverings for the affected receptor, or shutting down the turbine during the period shadow flicker would occur. Such measures~~	There is currently no established threshold for evaluating impacts resulting from shadow flicker; this MM is overly conservative. We suggest that the County address shadow flicker using similar methods to address other public nuisances.	15

GP-4—Golden Hills, LLC

			reduce the effect to acceptable limits.	~~may be undertaken in consultation with the affected resident or business owner. If the shadow flicker study indicates that any given turbine would result in shadow flicker exceeding the 30-minute/30-day thresholds, the turbine would be relocated to reduce the effect to acceptable limits.~~		15 cont.
16.	3.1.2	3.1-31	**Impact AES-6b: Consistency with state and local policies— Golden Hills Project (less than significant with mitigation)** Under the Golden Hills Project, the County would be obligated to comply with measures set forth to protect visual resources along scenic roadways and open space areas identified for protection, as detailed in the Scenic Route and Open Space Elements of the Alameda County General Plan (Alameda County 1966). In addition, the County is obligated to comply with measures set forth in the ECAP to protect visual resources such as sensitive viewsheds, streets and highways, scenic highways, and areas affected by windfarms (Alameda County 2000). The turbines would be neutral and nonreflective (e.g., dull white or light gray) so as to blend with the surroundings. However, the proposed project would still introduce large, visually obtrusive turbines within existing viewsheds of scenic viewsheds in proximity to sensitive viewers and residences. Implementation of Mitigation Measures AES-2a, AES-2b, AES-2c, and AES-3, and AES-5 would reduce this impact to a less-than significant level.	**Impact AES-6b: Consistency with state and local policies—Golden Hills Project (less than significant with mitigation)** Under the Golden Hills Project, the County would be obligated to comply with measures set forth to protect visual resources along scenic roadways and open space areas identified for protection, as detailed in the Scenic Route and Open Space Elements of the Alameda County General Plan (Alameda County 1966). In addition, the County is obligated to comply with measures set forth in the ECAP to protect visual resources such as sensitive viewsheds, streets and highways, scenic highways, and areas affected by windfarms (Alameda County 2000). The turbines would be neutral and nonreflective (e.g., dull white or light gray) so as to blend with the surroundings. ~~However~~ While, ~~the~~ the proposed project would replace smaller existing turbines with larger, more ~~still introduce large,~~ visually obtrusive turbines within existing viewsheds, there will be considerably fewer turbines as a result of repowering. ~~of scenic viewsheds in proximity to sensitive viewers and residences.~~ Implementation of Mitigation	Comment provided on 3/17. Draft PEIR failed to respond to comment. AES-6 does not specify existence of current windfarms as the baseline. See suggested language	16

GP-4—Golden Hills, LLC

				Measures AES-2a, AES-2b, AES-2c, and AES-3, and AES-5 would reduce this impact to a less-than significant level.		16 cont.
17.	Figure 3.1-1		4. Midway Substation from Patterson Pass Road looking east.	4. ~~Midway~~ PG&E Tesla Substation from Patterson Pass Road looking east.	Emailed comment from NextEra on 3/25. Draft PEIR failed to respond to comment. Please clarify that substation is a PG&E substation.	17
Agricultural Resources						
18.	3.2.2	3.2-7 and 3.2-9	Impact AG-1a-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use—Alternative 1: Repowering Program 417 MW (less than significant with mitigation)		Comment provided on 3/17. Draft PEIR failed to respond to comment. AG-1 does not take into account that repowering would reduce the number of turbines, and therefore may put more land back into agriculture, which could be subtracted out of the land newly taken from agriculture. Suggest adding a sentence stating that removal of old turbines will restore __ acres for agricultural use.	18
Air Quality						
19.	Section 3.3.1	3.3-6	In addition, the SJVAB is downwind of the project site some emissions that are emitted at the project site within the SFBAAB would likely drift into the SJVAB through a process known as transport.	In addition, <u>because</u> the SJVAB is downwind of the project site<u>,</u> some emissions that are emitted at the project site within the SFBAAB would likely drift into the SJVAB through a process known as transport.	Current sentence appears to be missing some wording.	19
20.	Section 3.3.1, Table 3.3-3	3.3-13	Entry for Federal Designation for O3 (1-hour).	Replace "-[8]" with <u>"(No Federal Standard)[8]"</u>	Suggest replacement to be consistent with other table entries while maintaining footnote.	20
21.	3.3.2	3.3-26	**MM AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures.**	**MM AQ-2b: Reduce construction-related air pollutant emissions by ~~implementing~~ <u>complying with</u> measures ~~based on~~ <u>in</u> BAAQMD's Additional Construction Mitigation Measures.**	Comment provided on 3/17. Draft PEIR failed to respond to comment.	21
22.	3.3.2	3.3-26	All exposed surfaces will be watered at a frequency adequate to maintain minimum soil moisture of	All exposed surfaces will be watered at a frequency adequate <u>to ensure visible dust is avoided.</u> ~~to~~	See suggested edit.	22

GP-4—Golden Hills, LLC

			12%. Moisture content can be verified by lab samples or moisture probe.	~~maintain minimum soil moisture of 12%. Moisture content can be verified by lab samples or moisture probe~~.		22 cont.
23.	3.3.2	3.3-26	Wind breaks (e.g., trees, fences) will be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50% air porosity.	~~Wind breaks (e.g., trees, fences) will be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50% air porosity.~~	Planting trees within construction areas is onerous and infeasible.	23
24.	3.3.2	3.3-38	Impact AQ-3a-2: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)—Repowering Program Alternative 2: 450 MW (significant and unavoidable for construction and less than significant for operation)		Comment provided on 3/17. Draft PEIR failed to respond to comment. Unclear why the daily emissions for new operations would be unchanged. Presumably the new state-of-the-art turbines would require less maintenance and therefore fewer trips than the existing turbines. Please add language confirming that operations would result in improved air quality. See, p. 3.3-15: "daily and annual emissions of criteria pollutants associated with operational activities are anticipated to be the same under the program as under existing condition; consequently, they would not result in a significant contribution to existing air quality violations."	24
Biological Resources						
25.	3.4.1	3.4-7	As an alternative to the NCCP called for in the Settlement Agreement, the County has developed a draft *Avian Protection Program* (APP) to provide a framework and process for wind energy projects to comply with applicable statutes (e.g., MBTA and BGEPA) through the repowering process.	As an alternative to the NCCP called for in the Settlement Agreement, the County has prepared this PEIR with mitigation measures to provide a framework and process to permit wind projects in the APRA and to promote conservation measures to benefit avian species. ~~developed a draft *Avian Protection Program* (APP) to provide a framework and process for wind energy projects to comply with applicable statutes (e.g., MBTA and BGEPA) through~~	Per discussion between NextEra and County, please delete all references and discussion in PEIR to Avian Protection Program and NCCP. See suggested language.	25

GP-4—Golden Hills, LLC

				~~the repowering process.~~		25 cont.
26.	Table 3.4-2	3.4-9			Table 3.4-9 summarizes approximate acreages of land cover in project area. Total acreage is shown as 4,480. Please see Comment #1.	26
27.	Table 3.4-8	3.4-50	Table shows total impacts to be: Perm: 125.34 Temp (Const+Decom): 240.96 And includes the following footnotes: [a] These impact estimates do not include offset of land cover that is returned to natural conditions from removal of facilities and roads. Therefore, acreages of impacts are likely to be lower than those shown here. [b] Acreage was not calculated for impacts on drainages. Typically, such impacts are measured in linear feet; these impacts will be quantified when design drawings are available.		Per the Project Description submitted to County on 12/18/2013, the anticipated temporary impact from the Golden Hills project is 414 acres.	27
28.	3.4.2	3.4-57	**Mitigation Measure BIO-1a: Conduct surveys to determine the presence or absence of special-status plant species** Project proponents will conduct surveys for the special-status plant species within and adjacent to all project sites. All surveys will be conducted by qualified biologists in	**Mitigation Measure BIO-1a: Conduct surveys to determine the presence or absence of special-status plant species** Project proponents will conduct surveys for the special-status plant species within and adjacent to all project sites. All surveys will be conducted by qualified biologists in	Comment provided on 3/17. Draft PEIR failed to fully respond to comment.	28

GP-4—Golden Hills, LLC

			accordance with the appropriate protocols. Special-status plant surveys will be conducted in accordance with *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. No more than 3 years prior to ground-disturbing repowering activities and during the appropriate identification periods for special-status plants (Table 3.4-4), a qualified biologist (as determined by Alameda County) will conduct field surveys within decommissioning work areas, proposed construction areas, and the immediately adjacent areas to determine the presence of habitat for special-status plant species. The project proponent will submit a report documenting the survey results to Alameda County for review and approval no less than 1 year prior to conducting any repowering activities. The report will include the location and description of all proposed work areas, the location and description of all suitable habitat for special-status plant species, and the location and description of other sensitive habitats (e.g., vernal pools, wetlands, riparian areas). Additionally, the report will outline where additional species and/or habitat-specific mitigation measures are required. This report will provide the basis for any applicable	accordance with the appropriate protocols. Special-status plant surveys will be conducted in accordance with *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. No more than 3 years prior to ground-disturbing repowering activities and during the appropriate identification periods for special-status plants (Table 3.4-4), a qualified biologist ~~(as determined by Alameda County)~~ will conduct field surveys within decommissioning work areas, proposed construction areas, and the immediately adjacent areas to determine the presence of habitat for special-status plant species. The project proponent will submit a report documenting the survey results to Alameda County for review and approval prior to conducting any repowering activities. The report will include the location and description of all proposed work areas, the location and description of all suitable habitat for special-status plant species, and the location and description of other sensitive habitats (e.g., vernal pools, wetlands, riparian areas). Additionally, the report will outline where additional species and/or habitat-specific mitigation measures are required. This report will provide the basis for any applicable permit applications	

28 cont.

GP-4—Golden Hills, LLC

			permit applications where incidental take of listed species may occur.	where incidental take of listed species may occur.		28 cont.
29.	3.4.2	3.4-59	All project proponents will avoid or minimize temporary and permanent impacts on special status plants that occur on project sites and will compensate for impacts on special-status plant species. Although all impacts on large-flowered fiddleneck, diamond-petaled California poppy, and caper-fruited tropidocarpum will be avoided, impacts on other special-status plant species will be avoided to the extent feasible, and any unavoidable impacts will be addressed through compensatory mitigation. 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 will be compensated for through the acquisition, protection, and subsequent management in perpetuity of other existing occurrences at a 2:1 ratio (occurrences impacted: occurrences preserved). The project proponent will provide detailed information to the County and CDFW on the location of the preserved occurrences, quality of the preserved habitat, feasibility of protecting and managing the areas in-perpetuity, responsibility parties, and other pertinent information. If suitable occurrences of a special-status plant species are not available for preservation, then the project will be redesigned to remove features that would result in impacts on that species.	All project proponents will avoid or minimize temporary and permanent impacts on special status plants that occur on project sites and will compensate for impacts on special-status plant species through appropriate mitigation as determined during consultation with USFWS and/or CDFW. Although all impacts on large-flowered fiddleneck, diamond-petaled California poppy, and caper-fruited tropidocarpum will be avoided, impacts on other special-status plant species will be avoided to the extent feasible, and any unavoidable impacts will be addressed through compensatory mitigation. ~~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 will be compensated for through the acquisition, protection, and subsequent management in perpetuity of other existing occurrences at a 2:1 ratio (occurrences impacted: occurrences preserved). The project proponent will provide detailed information to the County and CDFW on the location of the preserved occurrences, quality of the preserved habitat, feasibility of protecting and managing the areas in-perpetuity, responsibility parties, and other pertinent information. If suitable occurrences of a special-status plant species are not available for preservation, then the project will be redesigned to~~	This MM exceeds what is required under ESA for endangered plant species. There are no federal or state requirements for plant species protection on private lands. In addition, not all special status plant species are equally protected and require a take permit/BO. As written, those other plant species would require compensatory mitigation. Please delete MM.	29

GP-4—Golden Hills, LLC

GOLDEN HILLS WIND, LLC
JULY 21, 2014

				~~remove features that would result in impacts on that species~~		29 cont.
30.	3.4.2	3.4-63 through -74, 3.4-77 through 80.	Impact BIO-3a-1: Potential mortality of or loss of habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle—Alternative 1: Repowering Program 417 MW (less than significant with mitigation)	However, with fewer turbines proposed for installation, fewer roads, supporting electrical infrastructure, reduced operations and maintenance practices will be required. In addition, firebreaks are no longer needed with new-generation turbines (see Section 2.4.4), and this will result in a reduction in herbicide spraying and no ground-disturbing tilling This reduction in disturbed area and ongoing operational access results in a reduced impact to sensitive species than with the current operational requirements.	Comment provided on 3/17. Draft PEIR failed to respond to comment, Bio 3 (vernal pool branchiopods), Bio 4 (elderberry longhorn beetle), Bio 5 (special status amphibians), Bio 7 (reptiles), Bio 10 (kit fox and badger) relate to how operations will affect existing species. The analyses do not take into account that using a smaller footprint for repowered windfarms is likely to require a smaller footprint of maintenance, firebreaks, pesticides, etc which will have a smaller effect on the existing species than the existing turbines. Please add suggested language to each section.	30
31.		3.4-69	**Mitigation Measure BIO-4b: Compensate for direct and indirect effects on** If elderberry shrubs cannot be avoided and protected as outlined in Mitigation Measure 4a, the project proponent will obtain an incidental take permit from USFWS and compensate for the loss of any elderberry shrubs. Surveys of elderberry shrubs to be transplanted will be conducted by a qualified biologist prior to transplantation. Surveys will be conducted in accordance with the Conservation Guidelines for the Valley Elderberry Longhorn Beetle (U.S. Fish and Wildlife Service 1999). Survey results and an analysis of the number of elderberry seedlings/cuttings and associated native plants based on the survey results will be submitted to USFWS in a biological assessment or an HCP. After	**Mitigation Measure BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle** If activities conducted as part of Mitigation Measure 4a determine that the project will impact the elderberry longhorn beetle, the project proponent will obtain authorization from the appropriate permitting authority (e.g., USFWS Biological Opinion) to compensate for the loss of any valley elderberry longhorn beetle. The project proponent will compensate for direct and permanent effects on the valley elderberry longhorn beetle as required by the applicable USFWS authorization. ~~If elderberry shrubs cannot be avoided and protected as outlined in Mitigation Measure 4a, the project proponent will obtain an incidental take permit a from USFWS and compensate for the~~	Comment provided on 3/17. Draft PEIR failed to respond to comment. Global edit: USFWS approval for take of a listed species is through a Biological Opinion, not an incidental take permit. Please update language throughout PEIR.	31

PAGE 14 OF 29

GP-4—Golden Hills, LLC

			receipt of an incidental take permit and before construction begins, the project proponent will compensate for direct effects on elderberry shrubs by transplanting shrubs that cannot be avoided to a USFWS-approved conservation area. Elderberry seedlings or cuttings and associated native species will also be planted in the conservation area. Each elderberry stem measuring 1 inch or more in diameter at ground level that is adversely affected (i.e., transplanted or destroyed) will be replaced, in the conservation area, with elderberry seedlings or cuttings at a ratio ranging from 1:1 to 8:1 (new plantings to affected stems). The numbers of elderberry seedlings/cuttings and associated riparian native trees/shrubs to be planted as replacement habitat are determined by stem size class of affected elderberry shrubs, presence or absence of exit holes, and whether the shrub lies in a riparian or nonriparian area. Stock of either seedlings or cuttings would be obtained from local sources. At the discretion of USFWS, shrubs that are unlikely to survive transplantation because of poor condition or location, or a plant that would be extremely difficult to move because of access problems, may be exempted from transplantation. In cases where transplantation is not possible, minimization ratios would be increased to offset the additional habitat loss. The relocation of the elderberry shrubs will be conducted according to USFWS-approved procedures outlined in the Conservation	~~loss of any elderberry shrubs elderberry longhorn beetle. Surveys of elderberry shrubs to be transplanted will be conducted by a qualified biologist prior to transplantation. Surveys will be conducted in accordance with the Conservation Guidelines for the Valley Elderberry Longhorn Beetle (U.S. Fish and Wildlife Service 1999). Survey results and an analysis of the number of elderberry seedlings/cuttings and associated native plants based on the survey results will be submitted to USFWS in a biological assessment or an HCP. After receipt of an incidental take permit and before construction begins, the project proponent will compensate for direct effects elderberry shrubs by transplanting shrubs that cannot be avoided to a USFWS approved conservation area. Elderberry seedlings or cuttings and associated native species will also be planted in the conservation area. Each elderberry stem measuring 1 inch or more in diameter at ground level that is adversely affected (i.e., transplanted or destroyed) will be replaced, in the conservation area, with elderberry seedlings or cuttings at a ratio ranging from 1:1 to 8:1 (new plantings to affected stems). The numbers of elderberry seedlings/cuttings and associated riparian native trees/shrubs to be planted as replacement habitat are determined by stem size class of affected elderberry shrubs, presence or absence of exit holes, and whether the shrub lies in a riparian or nonriparian area. Stock of either seedlings or cuttings~~		31 cont.

GP-4—Golden Hills, LLC

			Guidelines (U.S. Fish and Wildlife Service 1999). Elderberry shrubs within the project construction area that cannot be avoided will be transplanted during the plant's dormant phase (November through the first 2 weeks of February). A qualified biological monitor will remain onsite while the shrubs are being transplanted. Evidence of valley elderberry longhorn beetle occurrence in the conservation area, the condition of the elderberry shrubs in the conservation area, and the general condition of the conservation area itself will be monitored over a period of 10 consecutive years or for 7 years over a 15-year period from the date of transplanting. The project proponent will be responsible for funding and providing monitoring reports to USFWS in each of the years in which a monitoring report is required. As specified in the Conservation Guidelines, the report will include information on timing and rate of irrigation, growth rates, and survival rates and mortality.	~~would be obtained from local sources.~~		31 cont.
32.	3.4.2	3.4-73	**Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians** All project proponents will ensure that BMPs and other appropriate measures, in accordance with measures developed for the EACCS, be incorporated into the appropriate design and construction documents. Implementation of some of these measures will require that the project proponent obtain incidental take permits from	**Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians** All project proponents will ensure that BMPs and other appropriate measures, in accordance with measures developed for the EACCS, be incorporated into the appropriate design and construction documents. Implementation of some of these measures will require that the project proponent obtain incidental	Comment provided on 3/17. Draft PEIR failed to respond to comment. Please cite California SWRCB NPDES construction general requirements for stormwater. As appropriate, please refer reader to section where laws are discussed.	32

GP-4—Golden Hills, LLC

			USFWS (California red-legged frog and California tiger salamander) and from CDFW (California tiger salamander only) before construction begins. Additional conservation measures or conditions of approval may be required in applicable project permits (i.e., ESA incidental take permit). Ground-disturbing activities 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% 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. [……]	take permits from USFWS (California red-legged frog and California tiger salamander) and from CDFW (California tiger salamander only) before construction begins. Additional conservation measures or conditions of approval may be required in applicable project permits (i.e., ESA incidental take permit). Applicant will comply with State of California State Water Resources Control Board NPDES construction general requirements for stormwater. ~~Ground disturbing activities 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% 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.~~ [……]		32 cont.
33.	3.4.2	3.4-75	The plan will include a requirement to monitor restoration areas annually (between March and May) for up to 3 years following the year of restoration.	The plan will include a requirement to monitor restoration areas annually (between March and ~~May~~ October) for up to 3years, unless there are drought conditions, following the year of restoration.	Since invasive species is a component of the restoration success criteria, the associated monitoring period should occur from early spring (March) to late summer (October) to coincide with the extended growing season for invasive species.	33
34.	3.4.2	3.4-75	Additionally, the project proponent will provide annual monitoring reports to the County by August 1	Additionally, the project proponent will provide annual monitoring reports to the County by ~~August 1~~	This proposed revision is consistent with the revision proposed above.	34

GP-4—Golden Hills, LLC

			of each year, summarizing the monitoring results and any remedial measures implemented (if any are necessary).	~~of each year~~ January 31 following each monitoring year, summarizing the monitoring results and any remedial measures implemented (if any are necessary).		34 cont.
35.	3.4.2	3.4-86	Remove suitable nesting habitat (shrubs and trees) during the non-breeding season (September 1–January 31) for nesting birds.	To the extent feasible, ~~R~~remove onsite suitable nesting habitat (shrubs and trees) during the non-breeding season (September 1–January 31) for nesting birds.	Revised because landowner and/or resource agency work window restrictions may preclude implementation of this preventative measure.	35
36.	3.4.2	3.4-134	**Mitigation Measure BIO-15: Compensate for the loss of alkali meadow habitat** If alkali meadow habitat is filled or disturbed as part of a repowering project, the project proponent will compensate for the loss of this habitat to ensure no net loss of habitat functions and values. Compensation ratios will be based on site-specific information and determined through coordination with state and federal agencies (CDFW, USFWS, USACE). The compensation will 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, offsite restoration, and mitigation credits. A restoration and monitoring plan will be developed and implemented. The plan will describe how alkali meadow habitat will be created and monitored.	**Mitigation Measure BIO-15: Compensate for the loss of alkali meadow habitat** If alkali meadow habitat is filled or disturbed as part of a repowering project, the project proponent will compensate for the loss of this habitat to ensure no net loss of habitat functions and values. Compensation ratios will be based on site-specific information and determined through permit conditions ~~coordination~~ with state and federal agencies (CDFW, USFWS, USACE). ~~The compensation will 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, offsite restoration, and mitigation credits. A restoration and monitoring plan will be developed and implemented. The plan will describe how alkali meadow habitat will be created and monitored.~~	Comment provided on 3/17. Draft PEIR failed to respond to comment. See suggested revision. Please apply changes to BIO-16 and BIO-18, Suggest stating in text that ECAP is incorporated by reference.	36
37.	3.4.2	3.4-137	**Impact BIO-17b: Potential for ground-disturbing activities to result in direct adverse effects on common habitats—Golden Hills Project (less than significant)** [….] At each reclamation site, the topography would be graded to	**Impact BIO-17b: Potential for ground-disturbing activities to result in direct adverse effects on common habitats—Golden Hills Project (less than significant)** [….] At each reclamation site, the topography would be ~~graded to~~	Comment provided on 3/17. Draft PEIR failed to respond to comment. Global edit: Unless specified by County ordinance or permit requirements, language on contouring to pre-existing conditions in PEIR	37

GP-4—Golden Hills, LLC

			match the contours of the natural surrounding landscape, stabilized, reseeded with an appropriate seed mixture, and allowed to become revegetated without assistance. Reclamation activities would be guided by a reclamation plan developed in coordination with the County and other applicable agencies. This impact would be less than significant. No mitigation is required.	~~match the contours of the natural surrounding landscape,~~ stabilized, reseeded with an appropriate seed mixture, and allowed to become revegetated without assistance. Reclamation activities would be guided by a reclamation plan developed in coordination with the County and other applicable agencies. This impact would be less than significant. No mitigation is required.	should be removed since it could result in greater impacts.	37 cont.
Cultural Resources						
38.		3.5-17	**Impact CUL-1b: Cause a substantial adverse change in the significance of a historic resource—Golden Hills Project (less than significant with mitigation)** The Golden Hills Project may cause a substantial adverse change in the significance of a historical resource—Dam #3 (P01-010958). This resource is the remains of an earthen dam that measured 30 feet long, 12 feet wide, and 10 feet high. Per the 1999 recordation, the associated pond, located behind it, had dried up. No other features are recorded or were observed during the Google Earth remote reconnaissance survey by the architectural historian in June 2013.		Where is this resource located? Please confirm that P01-010958 is located within the Golden Hills boundary. This resource was not provided by NWIC in search of resources within 1 mile of the project boundary. This resource is also not discussed elsewhere in section.	38
Greenhouse Gases						
39.	3.7.1, Table 3.7-1	3.7-9			The greenhouse gas column lists units (ppm/ppt/ppb) which actually only apply to the 2005 atmospheric abundance (last column), and not the GWP (which is a comparative factor) or lifetime columns. Suggest clarifying	39

GP-4—Golden Hills, LLC

					column headers and moving units in question to the last column so as not to mislead the reader.	39 cont.
40.	3.7.2	3.7-17			Comment provided on 3/17. Draft PEIR failed to respond to comment. Do the calculations for concrete sinks account for the reduction in concrete associated with removing the old turbines/infrastructure that is no longer needed? Please confirm calculations and how they relate to the concrete that will be removed for decommissioning.	40
Noise						
41.	3.11.1	3.11-1	In general, human sound perception is such that a change in sound level of 1 dB cannot typically be perceived by the human ear, a change of 3 dB is barely noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level.	In general, human sound perception is such that a change in sound level of 1 dBA cannot typically be perceived by the human ear, a change of 3 dBA is barely noticeable, a change of 5 dBA is clearly noticeable, and a change of 10 dBA is perceived as doubling or halving the sound level when comparing similar sounds (i.e., traffic to traffic).	The increased attenuation is typically in the range of 1 to 2 dBA per doubling of distance. Add underlined section and clarify that most of the discussion in this section is applicable to dBA.	41
42.	3.11.1	3.11-3	The International Standard IEC 61400-11 for wind turbine noise assessment provides a requirement for evaluating tonality.	The International Standard IEC 61400-11 for wind turbine noise assessment provides a requirement for evaluating tonality at the IEC test location which is close to the turbine. Far field tonality at typical residential distances may be evaluated using a variety of methods, however, if a tone is not present at the IEC test location it should not materialize at the resident.	See suggested edit.	42
43.		3.11-4	Wind turbines produce a broadband sound (i.e., the sound occurs over a wide range of frequencies,	Wind turbines produce a broadband sound (i.e., the sound occurs over a wide range of	See suggested edit.	43

GP-4—Golden Hills, LLC

			including low frequencies). Low-frequency sounds are in the range of 20–100 Hz, and infrasonic sound (or *infrasound*) is low-frequency sound of less than 20 hertz. Compared with higher frequency sound, low-frequency sound propagates over longer distances, is transmitted through buildings more readily, and can excite structural vibrations (e.g., rattling windows or doors). The threshold of perception, in decibels, also increases as the frequency decreases. For example, in the frequency range where humans hear best (in the low kilohertz), the threshold of hearing is at about 0 dB, but at a frequency of only 10 Hz, the threshold of hearing is at about 100 dB (Rogers et al. 2006a). Older wind turbines—particularly those in which the blades were on the downwind side of the tower—produced more low-frequency sound because their towers blocked wind flow, causing the blades to pass through more turbulent air. Modern, upwind turbines produce a broadband sound that includes low-frequency sounds, but not at significant levels. A primary cause for low-frequency sounds in modern turbines is the blade passing through the change in air flow at the front of the tower, and this can be aggravated by unusually turbulent wind conditions. This effect is generally referred to as blade amplitude modulation because the aerodynamic noise generated by the blades (the “swishing” sound) is modulated as the turbine blades pass through uneven air velocities. The uneven	frequencies, including low and high frequencies). Low-frequency sounds are in the range of 20–100 Hz, and infrasonic sound (or *infrasound*) is low-frequency sound of less than 20 hertz. Compared with higher frequency sound, low-frequency sound propagates over longer distances, is transmitted through buildings more readily, and at very high levels can excite structural vibrations (e.g., rattling windows or doors). Older wind turbines—particularly those in which the blades were on the downwind side of the tower—produced more low-frequency sound because their towers blocked wind flow, causing the blades to pass through more turbulent air. Modern, upwind turbines produce a broadband sound that includes low-frequency sounds, but not at significant levels. A primary cause for low-frequency sounds in modern turbines is the blade passing through ~~the change in air flow at the front of the tower, and this can be aggravated by~~ unusually turbulent wind conditions. ~~This effect is generally referred to as blade amplitude modulation because the aerodynamic noise generated by the blades (the “swishing” sound) is modulated as the turbine blades pass through uneven air velocities.~~ The uneven air that causes this effect may be due to interaction of other turbines, excessive wind shear, or topography (Bowdler 2008). These factors may also contribute to	

43 cont.

GP-4—Golden Hills, LLC

GOLDEN HILLS WIND, LLC
JULY 21, 2014

			air that causes this effect may be due to interaction of other turbines, excessive wind shear, or topography (Bowdler 2008).	periodic increases in the prominence of blade swish or amplitude modulation.		43 cont.
44.	3.11.1	3.11-2	Table 3.11-1: C-Weighted Decibel (dBC) -- The sound pressure level in decibels as measured using the Cweighting filter network. The C-weighting is very close to an unweighted or "flat" response. C-weighting is only used in special cases when low-frequency noise is of particular importance. A comparison of measured A and C weighted level gives an indication of low frequency content.	~~C-Weighted Decibel (dBC) -- The sound pressure level in decibels as measured using the Cweighting filter network. The C-weighting is very close to an unweighted or "flat" response. C-weighting is only used in special cases when low-frequency noise is of particular importance. A comparison of measured A and C weighted level gives an indication of low frequency content.~~	The entire discussion of dBC levels and C-weighted noise analysis (including Table 3.11-6 and the definition of C-weighted decibel in Table 3.11-1) should be removed, as there is no applicable County requirement stated in dBC and the analysis is misleading and flawed. A recent guidance document funded by the U.S. Department of Energy for the National Association of Regulatory Utility Commissioners specifically addresses the applicability of the dBC metric for wind energy facilities [Assessing Sound Emissions from Proposed Wind Farms & Measuring the Performance of Completed Projects, October 2011]. This document concludes "Despite their occasional appearance in local ordinances as an intended way to limiting the low frequency noise emissions from wind projects, by either an absolute limit or a dBC-dBA differential, C-weighted sound levels have no practical place in the measurement of wind turbine sound."	44
45.	3.11.1	3.11-7	The County Zoning Ordinance (County General Code, Chapter 17) restricts noise from commercial activities by prohibiting any use that would generate a noise or vibration that is discernible without instruments beyond the property line. This performance standard does not apply to transportation activities or temporary construction work.	~~The County Zoning Ordinance (County General Code, Chapter 17) restricts noise from commercial activities by prohibiting any use that would generate a noise or vibration that is discernible without instruments beyond the property line. This performance standard does not apply to transportation activities or temporary construction work.~~	This standard is not applicable to any Project lands. It is only applicable in industrial districts (M-P, M-1 and M-2). See County Code §17.42.020, 17.44.100 & 17.46.080.	45

PAGE 22 OF 29

GP-4—Golden Hills, LLC

46.		3.11-7	Conditional Use Permits The County's CUPs for the continued operation of the windfarms after 2005, regulated by Resolution Number R-2005-463, identified the following specific condition regarding noise levels. Noise Standards: Wind turbines shall be operated so as to not exceed the County's noise standard of 55 dBA (Ldn) or 70 dBC (Ldn) as measured in both cases at the exterior of any dwelling unit. If the dwelling unit is on land under lease from the Permittee, the applicable standard shall be 65 dBA (Ldn) and 70 dBC (Ldn). The Resolution approving the CUPs for windfarm operations included a finding that as a land use, the wind energy use "is properly related to other land uses and transportation and service facilities in the vicinity, in that… d) Although some residents may object to the visual, noise, or other effects of the turbines, the County has determined that the wind energy projects are in compliance with the conditions of approval and are an acceptable use in the area."	~~Conditional Use Permits~~ ~~The County's CUPs for the continued operation of the windfarms after 2005, regulated by Resolution Number R-2005-463, identified the following specific condition regarding noise levels.~~ ~~Noise Standards: Wind turbines shall be operated so as to not exceed the County's noise standard of 55 dBA (Ldn) or 70 dBC (Ldn) as measured in both cases at the exterior of any dwelling unit. If the dwelling unit is on land under lease from the Permittee, the applicable standard shall be 65 dBA (Ldn) and 70 dBC (Ldn).~~ ~~The Resolution approving the CUPs for windfarm operations included a finding that as a land use, the wind energy use "is properly related to other land uses and transportation and service facilities in the vicinity, in that… d) Although some residents may object to the visual, noise, or other effects of the turbines, the County has determined that the wind energy projects are in compliance with the conditions of approval and are an acceptable use in the area."~~	Discussion of a prior CUP condition of approval in this section is inappropriate. It is not a regulatory requirement or County standard; it is a condition of approval for a prior project-specific CUP—i.e., it will not apply to the Project and has no ongoing relevance or authority. The entire discussion of dBC levels and c-weighted noise analysis (including Table 3.11-6 and the definition of C-weighted decibel in Table 3.11-1) should be removed, as there is no applicable County requirement stated in dBC and the analysis is misleading and flawed.	46
47.	3.11.2	3.11-10	C-weighted sound levels for the REpower MM 92 turbine and the Vestas V90 are about 10 dB higher than A-weighted sound levels. The C-weighted county standard for wind turbines is 70 dBC (L_{dn}). Table 3.11-6 provides an indication of potential received noise levels expressed in dBC (Ldn) based	~~C-weighted sound levels for the REpower MM 92 turbine and the Vestas V90 are about 10 dB higher than A-weighted sound levels. The C-weighted county standard for wind turbines is 70 dBC (L_{dn}).~~ ~~Table 3.11-6 provides an indication of potential received noise levels expressed in dBC (Ldn) based~~	The entire discussion of dBC levels and c-weighted noise analysis (including Table 3.11-6 and the definition of C-weighted decibel in Table 3.11-1) should be removed, as there is no applicable County requirement stated in dBC and the analysis is misleading and flawed.	47

GP-4—Golden Hills, LLC

			on the distance to a receiver and the number of turbines influencing noise received at the receptor. The table also highlights distances within which the County standard of 70 dBC (Ldn) would be exceeded. Under the assumption that up to 10 turbines could affect the received noise level at a receptor, the results in Table 3.11-6 indicate that the County noise standard of 70 dBC(Ldn) could be exceeded within about 1,000 feet of a receptor.	~~on the distance to a receiver and the number of turbines influencing noise received at the receptor. The table also highlights distances within which the County standard of 70 dBC (Ldn) would be exceeded. Under the assumption that up to 10 turbines could affect the received noise level at a receptor, the results in Table 3.11-6 indicate that the County noise standard of 70 dBC(Ldn) could be exceeded within about 1,000 feet of a receptor.~~		47 cont.
48.	3.11.2	3.11-11	The County uses a noise standard for wind turbines in the program area of 55 dBA (Ldn) or 70 dBC (Ldn) at dwelling units, with the exception that dwelling units on the same parcel being leased for windfarm use may be exposed to up to 65 dBA (Ldn). Noise impacts associated with the proposed program are evaluated based on how the project would change the daily noise level associated with wind turbine operations. The threshold of 5 dB is used because it is generally considered to be the lowest sound level change clearly noticeable by the human ear.	The County uses a noise standard for wind turbines in the program area of 55 dBA (Ldn) ~~or 70 dBC (Ldn) at dwelling units~~, with the exception that dwelling units on the same parcel being leased for windfarm use may be exposed to up to 65 dBA (Ldn). Noise impacts associated with the proposed program are evaluated based on how the project would change the daily noise level associated with wind turbine operations. The threshold of 5 dB is used because it is generally considered to be the lowest sound level change clearly noticeable by the human ear.	This is incorrect. The County has no noise standards stated in dBC. The entire discussion of dBC levels and c-weighted noise analysis (including Table 3.11-6 and the definition of C-weighted decibel in Table 3.11-1) should be removed, as there is no applicable County requirement stated in dBC and the analysis is misleading and flawed.	48
49.	3.11.2	3.11-11	Exposure of residences to noise from new wind turbines in excess of 70 dBC (Ldn) where wind turbine noise is currently less than 70 dBC (Ldn).	~~Exposure of residences to noise from new wind turbines in excess of 70 dBC (Ldn) where wind turbine noise is currently less than 70 dBC (Ldn).~~	There is no basis for this being a standard for significance as there is no applicable noise requirement stated in dBC. The entire discussion of dBC levels and c-weighted noise analysis (including Table 3.11-6 and the definition of C-weighted decibel in Table 3.11-1) should be removed, as there is no applicable County requirement stated in dBC and the analysis is misleading and flawed.	49

GP-4—Golden Hills, LLC

50.	3.11.2	3.11-12	The noise prediction results in Table 3.11-5, however, indicate that residences located within about 1,500 feet of a group of turbines could be exposed to noise that exceeds 55 dBA (Ldn). The noise prediction results in Table 3.11-6 also indicates that residences located within about 800 feet of a group of turbines could be exposed to noise that exceeds 70 dBC (Ldn). Because of the possibility that implementation of program Alternative 1 could result in daily Ldn values caused by wind turbines to increase by more than 5 dB at locations where noise currently exceeds 55 dBA (Ldn), expose residences to noise in excess of 55 dBA (Ldn) where noise is currently less than 55 dBA (Ldn), or expose residence to noise in excess of 70 dBC (Ldn) this impact is considered to be significant. Implementation of Mitigation Measure NOI-1 would reduce this impact to a less-than-significant level.	The noise prediction results in Table 3.11-5, however, indicate that residences located within about 1,500 feet of a group of turbines could be exposed to noise that exceeds 55 dBA (Ldn). ~~The noise prediction results in Table 3.11-6 also indicates that residences located within about 800 feet of a group of turbines could be exposed to noise that exceeds 70 dBC (Ldn).~~ Because of the possibility that implementation of program Alternative 1 could result in daily Ldn values caused by wind turbines to increase by more than 5 dB at locations where noise currently exceeds 55 dBA (Ldn), expose residences to noise in excess of 55 dBA (Ldn) where noise is currently less than 55 dBA (Ldn)~~, or expose residence to noise in excess of 70 dBC (Ldn)~~ this impact is considered to be significant. Implementation of Mitigation Measure NOI-1 would reduce this impact to a less-than-significant level.	The entire discussion of dBC levels and c-weighted noise analysis (including Table 3.11-6 and the definition of C-weighted decibel in Table 3.11-1) should be removed, as there is no <u>applicable</u> County requirement stated in dBC and the analysis is misleading and flawed.
51.	3.11.2	3.11-12	**Mitigation Measure NOI-1: Perform project-specific noise studies and implement measures to comply with County noise standards** The applicant for any proposed repowering project will retain a qualified acoustic consultant to prepare a report that evaluates noise impacts associated with operation of the proposed wind turbines. This evaluation will include a noise monitoring survey to quantify existing noise conditions at noise sensitive receptors located within 2,000 feet of any proposed turbine location. This survey will	**Mitigation Measure NOI-1: Perform project-specific noise studies and implement measures to comply with County noise standards** The applicant for any proposed repowering project will retain a qualified acoustic consultant to prepare a report that evaluates noise impacts associated with operation of the proposed wind turbines. This evaluation will include a noise monitoring survey to quantify existing noise conditions at noise sensitive receptors located within 2,000 feet of any proposed turbine location. This survey will	There is no basis to include a C-weighted measure in any mitigation, as there are no applicable standards measured by dBC. The entire discussion of dBC levels and c-weighted noise analysis (including Table 3.11-6 and the definition of C-weighted decibel in Table 3.11-1) should be removed, as there is no <u>applicable</u> County requirement stated in dBC and the analysis is misleading and flawed.

50

51

GP-4—Golden Hills, LLC

GOLDEN HILLS WIND, LLC
JULY 21, 2014

			include measurement of the daily A-weighted and C-weighed Ldn values over a 1-week period and concurrent logging of wind speeds at the nearest meteorological station. The study will include a site-specific evaluation of predicted operational noise levels at nearby noise sensitive uses. If operation of the project is predicted to result in noise in excess of 55 dBA (Ldn) where noise is currently less than 55 dBA (Ldn), result in a 5 dB increase where noise is currently greater than 55 dBA(Ldn), or result in noise that exceeds 70 dBC (Ldn), the applicant will modify the project, including selecting new specific installation sites within the program area, to ensure that these performance standards will not be exceeded. Methods that can be used to ensure compliance with these performance standards include increasing the distance between proposed turbines and noise sensitive uses and the use of alternative turbine operational modes to reduce noise. Upon completion of the evaluation, the project applicant will submit a report to the County demonstrating how the project will comply with these performance standards. After review and approval of the report by County staff, the applicant will incorporate measures as necessary into the project to ensure compliance with these performance standards.	include measurement of the daily A-weighted ~~and C-weighed Ldn values~~ over a 1-week period and concurrent logging of wind speeds at the nearest meteorological station. The study will include a site-specific evaluation of predicted operational noise levels at nearby noise sensitive uses. If operation of the project is predicted to result in noise in excess of 55 dBA (Ldn) where noise is currently less than 55 dBA (Ldn)~~,~~ or result in a 5 dB increase where noise is currently greater than 55 dBA(Ldn)~~, or result in noise that exceeds 70 dBC (Ldn),~~ the applicant will modify the project~~, including selecting new specific installation sites within the program area,~~ to ensure that these performance standards will not be exceeded. Methods that can be used to ensure compliance with these performance standards include but are not limited to increasing the distance between proposed turbines and noise sensitive uses and the use of alternative turbine operational modes to reduce noise, or selecting new specific installation sites within the program area. Upon completion of the evaluation, the project applicant will submit a report to the County demonstrating how the project will comply with these performance standards. After review and approval of the report by County staff, the applicant will incorporate measures as necessary into the project to ensure compliance with these performance standards.		51 cont.
52.	3.11.2	3.11-13	The noise prediction results in Table 3.11-5, however, indicate that residences located within about	The noise prediction results in Table 3.11-5, however, indicate that residences located within	The entire discussion of dBC levels and c-weighted noise analysis (including Table 3.11-6 and the	52

PAGE 26 OF 29

GP-4—Golden Hills, LLC

			1,500 feet of a group of turbines could be exposed to noise that exceeds 55 dBA (Ldn). The noise prediction results in Table 3.11-6 also indicates that residences located within about 800 feet of a group of turbines could be exposed to noise that exceeds 70 dBC (Ldn). Because of the possibility that implementation of program Alternative 2 could result in daily Ldn values caused by wind turbines to increase by more than 5 dB at locations where noise currently exceeds 55 dBA (Ldn), expose residences to noise in excess of 55 dBA (Ldn) where noise is currently less than 55 dBA (Ldn), or expose residence to noise in excess of 70 dBC (Ldn) this impact is considered to be significant. Implementation of Mitigation Measure NOI-1 would reduce this impact to a less-than-significant level.	about 1,500 feet of a group of turbines could be exposed to noise that exceeds 55 dBA (Ldn). ~~The noise prediction results in Table 3.11-6 also indicates that residences located within about 800 feet of a group of turbines could be exposed to noise that exceeds 70 dBC (Ldn).~~ Because of the possibility that implementation of program Alternative 2 could result in daily Ldn values caused by wind turbines to increase by more than 5 dB at locations where noise currently exceeds 55 dBA (Ldn)~~,~~ or expose residences to noise in excess of 55 dBA (Ldn) where noise is currently less than 55 dBA (Ldn), ~~or expose residence to noise in excess of 70 dBC (Ldn)~~ this impact is considered to be significant. Implementation of Mitigation Measure NOI-1 would reduce this impact to a less-than-significant level.	definition of C-weighted decibel in Table 3.11-1) should be removed, as there is no applicable County requirement stated in dBC and the analysis is misleading and flawed.	52 cont.
53.	3.11.2	3.11-14	The noise prediction results in Table 3.11-5 however, indicate that residences located within about 1,500 feet of a group of turbines could be exposed to noise that exceeds 55 dBA (Ldn) or increases in noise greater than 5 dB. The noise prediction results in Table 3.11-6 also indicate that residences located within about 800 feet of a group of turbines could be exposed to noise that exceeds 70 dBC (Ldn). No new turbines are anticipated to be located within 1,000 feet of existing residences. Because of the possibility that daily Ldn value caused by wind turbines could increase by more than 5 dB at locations where noise currently exceeds 55 dBA (Ldn), expose	The noise prediction results in Table 3.11-5 however, indicate that residences located within about 1,500 feet of a group of turbines could be exposed to noise that exceeds 55 dBA (Ldn) or increases in noise greater than 5 dB. ~~The noise prediction results in Table 3.11-6 also indicate that residences located within about 800 feet of a group of turbines could be exposed to noise that exceeds 70 dBC (Ldn).~~ No new turbines are anticipated to be located within 1,000 feet of existing residences. Because of the possibility that daily Ldn value caused by wind turbines could increase by more than 5 dB at locations where noise currently	The entire discussion of dBC levels and c-weighted noise analysis (including Table 3.11-6 and the definition of C-weighted decibel in Table 3.11-1) should be removed, as there is no applicable County requirement stated in dBC and the analysis is misleading and flawed.	53

GP-4—Golden Hills, LLC

			residences to noise in excess of 55 dBA (Ldn) where noise is currently less than 55 dBA (Ldn), or expose residences to noise in excess of 70 dBC (Ldn) this impact is considered to be significant. Implementation of Mitigation Measure NOI-1, as discussed under Impact NOI-1a, would reduce this impact to a less-than-significant level.	exceeds 55 dBA (Ldn)~~,~~ or expose residences to noise in excess of 55 dBA (Ldn) where noise is currently less than 55 dBA (Ldn)~~, or expose residences to noise in excess of 70 dBC (Ldn)~~ this impact is considered to be significant. Implementation of Mitigation Measure NOI-1, as discussed under Impact NOI-1a, would reduce this impact to a less-than-significant level.		53 cont.
54.	3.11.2	3.11-14	The noise prediction results in Table 3.11-5 indicate that residences located within about 1,750 feet of a group of turbines could be exposed to noise that exceeds 55 dBA (Ldn) or increases in noise greater than 5 dB. The noise prediction results in Table 3.11-6 also indicate that residences located within about 1,000 feet of a group of turbines could be exposed to noise that exceeds 70 dBC (Ldn). Because the nearest residence would be more than 3,000 feet from the new turbines, operation of the new turbines is not expected to result in noise that exceeds 55 dBA(Ldn), 70 dBC(Ldn) or result in a 5 dBA increase in noise at residences. The operational noise impact is considered to be less than significant. No mitigation is required.	The noise prediction results in Table 3.11-5 indicate that residences located within about 1,750 feet of a group of turbines could be exposed to noise that exceeds 55 dBA (Ldn) or increases in noise greater than 5 dB. ~~The noise prediction results in Table 3.11-6 also indicate that residences located within about 1,000 feet of a group of turbines could be exposed to noise that exceeds 70 dBC (Ldn).~~ Because the nearest residence would be more than 3,000 feet from the new turbines, operation of the new turbines is not expected to result in noise that exceeds 55 dBA(Ldn)~~, 70 dBC(Ldn)~~ or result in a 5 dBA increase in noise at residences. The operational noise impact is considered to be less than significant. No mitigation is required.	The entire discussion of dBC levels and c-weighted noise analysis (including Table 3.11-6 and the definition of C-weighted decibel in Table 3.11-1) should be removed, as there is no applicable County requirement stated in dBC and the analysis is misleading and flawed.	54
Alternatives						
55.	4.2.2 No Repowering – Reauthorization of Existing CUPs	4-25 and 4-26	The No Repowering—Reauthorization of Existing CUPs Alternative would not generate any short-term construction-related GHG emissions. The annual GHG emissions reduction of approximately 97,000 metric tons of CO2e associated with the proposed		Comment provided on 3/17. Draft PEIR failed to respond to comment. If existing turbines were to keep operating, then there would be a savings in GHG emissions relative to full decommissioning.	55

GP-4—Golden Hills, LLC

GOLDEN HILLS WIND, LLC
JULY 21, 2014

			Repowering Program would not occur under this alternative. This alternative would have no impact on GHG emissions.			55 cont.
56.	4.2.2 No Repowering – Reauthorization of Existing CUPs	4-25 and 4-26	Because the No Repowering—Reauthorization of Existing CUPs Alternative would entail no new construction activities, construction workers would not be exposed to potentially hazardous materials associated with construction materials, ground disturbance, or decommissioning older turbines. Operational impacts associated with hazards and hazardous materials would be similar to those under the proposed Repowering Program, with the exception of potential blade throw hazards. The potential blade throw hazard would be less, because the existing blade throw hazard distance is less than under the Repowering Program. Consequently, impacts related to hazards and hazardous materials under this alternative would be less than under the proposed Repowering Program.		Comment provided on 3/17. Draft PEIR failed to respond to comment. No Repowering- Reauthorization of Existing CUPs should have a larger impact on blade throw than the proposed project. Please revisit analysis.	56

PAGE 29 OF 29

GP-4—Golden Hills, LLC

Summary

The following document provides initial facility descriptions. Final engineering and design will be completed after the project is contracted.

Project Description

NextEra proposes an energy storage unit that will be sited within a one acre plot of land co-located with the proposed project's substation. The modular design will include individual lithium-ion batteries contained in either a newly constructed building that combines racks of batteries into partitioned sectors or in approximately thirty 40-foot International Standard Organization containers, depending on manufacturer specifications and weight limitations. With this type of modular design, the total storage capacity is a function of the quantity and size (MW) of each individual battery and the configuration of the unit's inverters and transformers.

Specifically, the configuration consists of building or standard ISO container sited battery module and management systems, connected to bi-directional inverters and pad-mount transformers which connect via a step up transformer to the grid-connection point. This allows the batteries to charge and discharge into the transmission system. The system will contain all of the necessary energy management software to maintain the health of the system, protection and monitoring capabilities and software to allow the scheduling coordinator to control charge and discharge of the batteries. The systems will be equipped with fire protection systems as necessary.

Initial site construction would include any site grading, ground grid installation and road construction required to access the site. All earth moving activities for the battery storage system will be within an area already expected to be disturbed by construction of the substation. Either a poured slab (for a building) or drilled pier foundations would be installed to support the Battery Energy Storage System containers. These containers are delivered to the site on flat bed trailers. The containers are reconstructed with the required racks, cables, battery management and SCADA hardware, fire detection and suppression, and air conditioning. Inverter skids and pad mount transformers will be installed on slab foundations as well. Each container, inverter in pad mount will be connected together via cable and fiber routed in tray or trenched. The batteries will be shipped separately from the containers in dedicated shipping containers. Construction is expected to take approximately 4 months.

Annually during the operation life of the project, battery additions will be required to supplement the initial installation.

Because of the volume of lithium-ion batteries used for the energy storage unit, the batteries are listed as "Hazardous Chemicals" for purposes of reporting in the Emergency Planning and Community Right to Know Act Tier II or the California Hazardous Materials Business Plan.

Waste batteries will be removed from the site and returned to the manufacturer or an approved battery reprocessor for recycling or disposal.

GP-4—Golden Hills, LLC

Subject: FW: Golden Hills: Comments on Draft PEIR
Attachments: NextEra Comment re bats and repowering RC.docx; NextEra Comment Regarding Golden Eagles and RepoweringRCJuly2014.docx

From: Pappalardo, Mike [mailto:MIKE.PAPPALARDO@nexteraenergy.com]
Sent: Monday, July 21, 2014 6:06 PM
To: Sandra.Rivera@acgov.org; Brungardt, Chris
Cc: Zeff, Sally; andrew.young@acgov.org; HART, DARYL; goldenhills.stewart@outlook.com; zack@SSLLAWFIRM.COM; Christine.Roberts@CH2M.com; Jessica.Golman@ch2m.com; Aarty.Joshi@CH2M.com; Culver, Renee
Subject: Golden Hills: Comments on Draft PEIR

Sandi:

In addition to the comments that were provided earlier by CH, we also wanted to supplement the record with the attached update on Golden eagles and bats. This information is a summary of the most recent data on Golden eagle and bat mortality that will be provided in more detail within the Vasco Winds second year monitoring report. We anticipate that the full report will be available sometime in late August.

Please feel free to contact me if you have any questions.

Mike Pappalardo | Environmental Manager
NextEra Energy Resources | 3368 Videra Drive | Eugene, OR 97405
office: 541.302.1345 | cell: 541.206.1005 | email: mike.pappalardo@nexteraenergy.com

NEXTera ENERGY RESOURCES

-

1

GP-4—Golden Hills, LLC

NextEra Comment Regarding Golden Eagles and Repowering

Golden eagles are year round residents of the Altamont Pass Wind Resource Area (APWRA) and historical studies have demonstrated that wind turbines have posed a risk to the individuals in the area. With the development of the Programmatic EIR, NextEra Energy Resources wishes to ensure that all available data is available for the evaluation of potential impact to the species, as relates to repowering. For that reason, NextEra has compiled a more up-to-date summary of mortality data with regard to repowered wind projects (Diablo Winds, Buena Vista and Vasco Winds) which includes unpublished estimates from mortality monitoring at the Vasco Winds repowering project. These repowered projects' estimates suggest that repowering of the APWRA could substantially reduce golden eagle fatalities. 57

Vasco Winds Monitoring Program Update

At the completion of the second year of mortality monitoring at all 34 the turbines at the Vasco Winds repowering project, four golden eagle carcasses had been found in total (Table 1). In year one a golden eagle was found at a turbine before official monitoring began at a 28 day search interval turbine. In year two three eagles were found, two at 28 day search interval turbines (incidentally found on plot) and one at a 7 day search interval turbine. As of the date of submission of this document, and into the third year of monitoring at Vasco Winds, a fifth eagle fatality had been discovered.

Table 1. Avian and bat fatalities found during the first two monitoring years, 21 May 2012 through 18 May 2014, at the Vasco Winds Area (total number found)

Species	Monitoring Year	28 day search interval	7 day search interval	Total, including incidentals
Golden eagle [c]	Year 1	1 (1)	0 (0)	1 (1)
Golden eagle	Year 2	2 [a] (2) [a]	1 (1)	3 [a] (3) [a]

[c] Golden eagle was found in February 2012, prior to fatality monitoring.
[a] Found on plot incidentally to routine searches, but included in adjusted fatality estimates.
*Note: A fifth golden eagle incident has been recorded in the first quarter of year three monitoring at the Vasco Winds project.

Repowering Comparisons

To date all three repowered projects (Diablo Winds, Buena Vista and Vasco Winds) have reported lower than APWRA wide average golden eagle mortality rates (Table 2). The following shows the average fatality rates, per MW, per year for repowered sites in the Altamont as well as for the APWRA-wide monitoring program. The APWRA-wide monitoring program, however, incorporates the lower rates for repowered areas in the "APWRA-wide" estimates, artificially reducing mortality rates that would be expected in areas where repowering has not yet occurred (or your baseline condition).

GP-4—Golden Hills, LLC

Table 2. Average estimated fatality rates for golden eagles for APWRA repowering projects and old generation APWRA-wide monitoring program	
	Estimated GOEA fatalities per MW/YR
Vasco Winds 2012-2014 (program ongoing)	0.03
Diablo Winds 2005-2009	0.01
Buena Vista 2007-2009	0.04
APWRA-wide monitoring Program 2005-2012	0.08

* Note: average values for estimates may not be directly comparable due to differences in monitoring programs and timelines under which data was collected.
* Note: values do not include indication of standard error or confidence intervals.
*APWRA-wide monitoring program data would include a calculated rate and expansion to MW capacity for all repowered sites as they come online. This dilutes the estimate if comparing old generation turbines to new is a goal.

57 cont.

GP-4—Golden Hills, LLC

21 July 2014

NextEra Comment Regarding Bats and Repowering

In the Altamont Pass Wind Resource Area, although there is a long record of monitoring, there is not a large base of information with regard to bats and risk to bats due to wind turbines. Several different resident and migratory bat species can be found in the general area, but it is unclear what impact repowered turbines will have on bats; it is difficult to develop accurate fatality estimates for individual bat species. 58

Below is an update as to the number of fatalities that were found during the second year of monitoring at the Vasco Winds project. It should be noted that unadjusted numbers can be very different than adjusted estimates. This is due to corrections that are made for bats that are scavenged and bats that are missed during monitoring activities.

Unadjusted number of bat fatalities found during Vasco Winds monitoring	
	Number of bat fatalities (unadjusted)
Year 1	18
Year 2	17

In order to adjust raw numbers of bat fatalities found at Vasco Winds, trial carcasses are placed to try to measure site specific simultaneous measurements of searcher detection rates and carcass persistence rates. Additionally, a measure of overall detectability is calculated for most species, but with bats it was not possible because no trial bats were found during monitoring trials. In place of that value, the product of the carcass persistence rates and the searcher detection rate were used. Adjustments for search radius and tower height are then made. Estimates of bat fatalities are currently in process for the year two for the Vasco Winds project.

E.6.4 Comment Letter GP-4—Golden Hills, LLC

Response to Comment GP-4-1

The applicant considered changing its project application, but this has not been done. No change to the PEIR is required.

Response to Comment GP-4-2

The text in the first paragraph of Section 2.2.1, *Overview*, on page 2-1 of the Draft PEIR has been revised as shown below.

> Windfarm uses are conditionally permitted in the "A" (Agriculture) zone district, which encompasses the entire program area. Windfarm uses have been permitted in the APWRA since the early 1980s with such CUPs, and <u>the terms of </u>the currently active CUPs (last approved in 2005 for continued operation of the windfarms, and amended in 2007) are <u>in effect </u>~~set to expire in~~<u>through</u> September 2018. ~~Those CUPs mandated that the windfarm operators would repower their windfarms by that expiration date.~~

Response to Comment GP-4-3

The text in the second paragraph of *Turbine Types* on pages 2-3 and 2-4 of the Draft PEIR has been revised as shown below.

> Empirical evidence (ICF Jones & Stokes 2009; Smallwood and Karas 2009) suggests that windfarms utilizing third- and fourth-generation turbines may have significantly less impact on avian species than those using first- and second-generation technology (65–70% reduction) (Insignia Environmental 2009; Smallwood and Karas 2009; Brown et al. 2013). This potential reduction is attributed to the much larger distance between the ground and the lowest point of the turbine blade, placing the rotor-swept area above the zone most used by resident birds, including small raptors. These turbines also rotate more slowly (in terms of revolutions per minute), potentially allowing birds time to maneuver away from the blades. However, because of the much longer blade length, the tip speed is usually greater on these turbines than on first- and second-generation turbines. In contrast, evaluation of mortality data collected at windfarms around the country (including in the APWRA) have suggested that current-generation turbines may lead to a<u>n</u>~~ substantial~~ increase in bat mortality (Barclay et al. 2007). Moreover, because of the scarcity of valid comparative data, ~~considerable ~~uncertainty remains regarding the effects of repowering on avian and bat mortality.

Response to Comment GP-4-4

In response to this comment, the second sentence in the last paragraph on page 2-11 of the Draft PEIR has been revised as shown below.

> Reclamation activities entail returning lands disturbed by infrastructure installation or removal to preproject conditions. Some facilities (e.g., roadways, turbine footings<u>, underground collection lines</u>) may be left in place if doing so is deemed to be more protective of natural resources than removal.

Response to Comment GP-4-5

In response to this comment, the third paragraph of *Existing Wind Turbine Removal* on page 2-17 of the Draft PEIR is revised as shown below.

> Grading ~~may be performed in some instances to match the surrounding contours, but it ~~will be avoided where appropriate to minimize and avoid disturbance of wildlife burrows that have adapted

to existing grade cuts. However, in some instances such grade cuts will be graded out to match the surrounding contours, if wildlife impacts can be avoided. New grading over existing foundations, equipment pads, or finger roads may be necessary for the installation of new access roads and foundation pads for repowered turbines.

Response to Comment GP-4-6

In response to this comment, the text in the second paragraph of *Postconstruction Reclamation* on pages 2-22 and 2-23 has been revised as shown below for clarification and consistency.

> Reclamation activities involve returning lands disturbed by infrastructure installation or removal to preproject conditions. Some facilities (e.g., roadways, turbine footings, underground collector lines) may be left in place if doing so is deemed to be more protective of natural resources than removal. At each reclamation site, the entire site is contour graded (if necessary and environmentally beneficial) ~~to conform to natural surrounding topography~~, stabilized, and reseeded with an appropriate seed mixture to maintain slope stability. No soil is removed from the site. Figure 2-9 shows reclamation of a turbine pad site. Exceptions to returning a site to preinstallation conditions may be made, with approval of the County Planning Department, if such reclamation activities would or could create water quality issues (e.g., erosion) or if the activities may adversely affect special-status species (e.g., burrowing owl burrow complexes, upland habitat for California red-legged frog or California tiger salamander).

Response to Comment GP-4-7

The applicant comments that Parcel # 99A-1760-1-4 shown on Table 2-3 is not a part of the Golden Hills project and should not be shown in the table. It is correct that the parcel is not proposed to be included in the project, and for that reason it is shown with 0 acres. The following change is made to Table 2-3 in response to this comment.

Table 2-3. Golden Hills Project Parcels

Assessor's Parcel Number	Acreage
99A-1760-1-3	112.9
~~99A-1760-1-4[a]~~	~~0.0~~
99A-1770-2-1	119.7
99A-1770-2-2	38.8
99A-1770-2-3	47.6
99A-1770-3	157.4
99A-1770-4	159.1
99A-1770-999-99	3.8
99A-1780-1-4	549.8
99A-1785-1-14	199.4
99A-1790-1	156.8
99A-1790-2	153.1
99A-1790-3	319.9
99A-1795-1	634.7
99A-1810-1	252.0
99B-5650-1-4[a]	64.7
99B-5650-2-1	70.5
99B-5650-2-3[a]	0.1

Assessor's Parcel Number	Acreage
99B-5650-2-4[a]	70.0
99B-6400-1-10	51.0
99B-6400-1-8	0.4
99B-6400-1-9	0.7
99B-6400-2-2	3.4
99B-6400-2-3	0.2
99B-6400-2-6	296.0
99B-6400-4[a]	33.0
99B-6425-2-3	252.3
99B-7800-2	10.7
99B-7800-9	38.1
99B-7890-1-3[a]	133.8
99B-7890-2-4[a]	107.5
99B-7890-5[a]	8.9
99B-7900-1-3	15.8
99B-7900-1-4	0.1
99B-7900-1-5[a]	253.8
99B-7900-1-6	6.1
99B-7900-1-7[a]	148.0
99B-7900-2[a]	9.9

[a] Acreage shown is portion of parcel within project area; remainder of parcel is outside project area boundary

Response to Comment GP-4-8

The commenter correctly points out that the minimum distance from ground to rotor tip at 6:00 position, depending on the turbine model, would be 30 meters (98 feet) rather than 38 meters (125 feet) as stated on page 2-27 in Section 2.6.1 of the Draft PEIR in *Proposed Project—Wind Turbines*. The relevant text has been revised as shown below.

> Golden Hills would likely select a turbine with characteristics similar to those of the GE 1.7 XLe model: a 1.7 MW turbine with a hub height of 80–96 meters (262–315 feet), a rotor diameter of 100–115 meters (328–377 feet), a total height up to 153 meters (502 feet), and a minimum distance from ground to rotor tip at 6:00 position of ~~38~~ 30 meters (~~125~~ 98 feet).

Response to Comment GP-4-9

The commenter requests minor revisions to the Golden Hills Project description text in the third paragraph of *Existing Facilities* on page 2-27 in Section 2.6.1, *Golden Hills Wind Energy Facility Repowering Project*, of the Draft PEIR. The revisions shown below have been made.

> Existing roads and other disturbed areas not needed for the proposed project's new turbines would be decommissioned, contour graded (if necessary and if environmentally beneficial), stabilized, and reseeded with an appropriate seed mixture to maintain slope stability.~~ and recontoured, as appropriate, to maintain slope stability. Following recontouring, surface soils would be prepared for planting and revegetated with seed stock.~~ Temporary erosion control measures would be implemented to maintain topsoil and revegetation.

Response to Comment GP-4-10

The commenter has provided additional information pertaining to the battery storage units that would constitute part of the proposed Golden Hills Project. The third paragraph of *Collector Substation* on page 2-30 of the Draft PEIR has been revised as shown below to reflect this new information.

> ~~Modular battery storage unit(s) could be installed within enclosed structures located within the proposed facility's substation area. The units would be inspected and maintained on an as-needed basis, in accordance with the facility's operational requirements and applicable regulations.~~ An energy storage unit encompassing approximately 1 acre would be constructed within the 3-acre permanent disturbance footprint of the collector substation facility. The modular design would accommodate lithium-ion batteries, either in a building or in approximately thirty 40-foot International Standard Organization (ISO) containers. The facility would contain all necessary energy management hardware and software to manage energy supply from the turbines to the power grid, as well as a fire detection and suppression system and air conditioning. Construction is anticipated to require approximately 4 months. Battery replacement would be required over the life of the project, and waste batteries would be removed from the site and transported either to the manufacturer or to an approved battery reprocessor for recycling or disposal.

Response to Comment GP-4-11

The commenter is requesting revisions to the description of reclamation activities associated with construction-related temporary disturbance areas that appears in the discussion of Construction Staging Areas on page 2-33, most notably the removal of a reference to replacing stockpiled topsoil. Because that practice is already specified in Mitigation Measure BIO-5c, that change will not be made. The remaining revisions have been made to the text as shown below to add consistency with other discussions.

> Following completion of construction activities, the contractor would restore the temporary construction staging areas. The gravel surface would be removed and the areas would be ~~recontoured~~ contour graded (if necessary and if environmentally beneficial) to conform with the natural topography, stockpiled topsoil would be replaced, and the area would be ~~seeded with an approved mixture of grasses~~ stabilized and reseeded with an appropriate seed mixture.

Response to Comment GP-4-12

The commenter, the Golden Hills project applicant, proposes changes to the project description for the Patterson Pass project description, which was based on information provided by the project proponent, Patterson Pass, LLC. The text has not been changed as requested.

Response to Comment GP-4-13

The text of the PEIR that the commenter references is part of the description of existing conditions and not of proposed changes to existing conditions associated with project or program construction and operation. Accordingly, no changes to the text of the PEIR are required.

Response to Comment GP-4-14

The mitigation measure noted by the commenter (Mitigation Measure AES-3) is necessary to reduce the identified impact to a less-than-significant level. Should the County decide not to adopt this mitigation measure, the impact would remain significant and unavoidable.

Response to Comment GP-4-15

The commenter states that there is no established threshold for evaluating impacts of shadow flicker. The County developed Mitigation Measure AES-5 based on the best available information available and examples of mitigation measures implemented in other jurisdictions. Please see Response to Comment GP-2-2 for more detailed discussion and revisions made to the mitigation measure. Additionally, NextEra (the commenter) provided the shadow flicker analysis conducted for the Golden Hills Project. That report is included as Appendix G of the Final PEIR.

Response to Comment GP-4-16

As discussed in Impacts AES-3b, AES-4b, and AES-5b on pages 3.1-22, 3.1-26, and 3.1-29 of the Draft PEIR, while existing wind turbines are present in portions of the Golden Hills project area, other portions of the project area have not previously been developed with wind turbines. The discussion of Impact AES-6b on page 3.1-31 has been revised as shown below for clarification.

Impact AES-6b: Consistency with state and local policies—Golden Hills Project (less than significant with mitigation)

Under the Golden Hills Project, the County would be obligated to comply with measures set forth to protect visual resources along scenic roadways and open space areas identified for protection, as detailed in the Scenic Route and Open Space Elements of the Alameda County General Plan (Alameda County 1966). In addition, the County is obligated to comply with measures set forth in the ECAP to protect visual resources such as sensitive viewsheds, streets and highways, scenic highways, and areas affected by windfarms (Alameda County 2000). The turbines would be neutral and nonreflective (e.g., dull white or light gray) so as to blend with the surroundings. ~~However,~~While the proposed project would replace smaller existing turbines with ~~still introduce~~ larger, more visually obtrusive turbines within existing viewsheds, there will be considerably fewer turbines as a result of repowering ~~of scenic viewsheds in proximity to sensitive viewers and residences~~. Implementation of Mitigation Measures AES-2a, AES-2b, AES-2c, and AES-3, and AES-5 would reduce this impact to a less-than-significant level.

Response to Comment GP-4-17

The commenter requests that the Midway Substation shown in Figure 3.1-1 be identified as a PG&E facility. The revision has been made to the figure caption.

Response to Comment GP-4-18

The commenter requests that the removal of old turbines be considered in the analysis of the loss of Prime Farmland. Because the removal of old turbines would only affect grazing land, no revision to the PEIR is necessary.

Response to Comment GP-4-19

The commenter correctly points out an editorial word emission in the discussion of the San Joaquin Valley Air Pollution Control District on page 3.3-6 of Section 3.3.1, *Air Quality—Existing Conditions*, of the Draft PEIR. The text has been revised as shown below.

In addition, because the SJVAB is downwind of the project site, some emissions that are emitted at the project site within the SFBAAB would likely drift into the SJVAB through a process known as transport.

Response to Comment GP-4-20

The commenter suggests revising language in Table 3.3-3 for consistency with other table entries. The text in Table 3.3-3 on page 3.3-13 of the Draft PEIR has been revised as shown below.

Table 3.3-3. Federal and State Attainment Status for Alameda County

Criteria Pollutant	Federal Designation	State Designation
O_3 (1-hour)	(No federal standard)~~–~~[a]	Serious Nonattainment
O_3 (8-hour)	Marginal Nonattainment (2008)	Nonattainment
CO	Maintenance	Attainment
PM10	Attainment	Nonattainment
PM2.5	Nonattainment (2006)	Nonattainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
Lead	Attainment (2008)	Attainment
Sulfates	(No Federal Standard)	Attainment
Hydrogen sulfide	(No Federal Standard)	Unclassified
Visibility	(No Federal Standard)	Unclassified

Sources: California Air Resources Board 2011; U.S. Environmental Protection Agency 2012.

O_3 = ozone.
CO = carbon monoxide.
PM10 = particulate matter less than or equal to 10 microns.
PM2.5 = particulate matter less than or equal to 2.5 microns.
NO_2 = nitrogen dioxide.
SO_2 = sulfur dioxide.

[a] The federal 1-hour standard of 12 parts per hundred million (pphm) was in effect from 1979 through June 15, 2005. The revoked standard is referenced here because it was employed for such a long period and because this benchmark is addressed in the state implementation plans.

Response to Comment GP-4-21

Because the language in the mitigation measure referenced by the commenter is standard usage, the County has decided not to make the suggested change to the text of the PEIR.

Response to Comment GP-4-22

The commenter requests revising Mitigation Measure MM-AQ-2b to remove the soil moisture content and sampling requirement. While the wind speed requirement identified in Mitigation Measure MM-AQ-2b is a standard BAAQMD mitigation requirement for projects with construction emissions in excess of their significance thresholds, the text of the first bullet of Mitigation Measure AQ-2b on page 3.2-26 of the Draft PEIR has been revised as shown below.

- During construction activities, all exposed surfaces will be watered at a frequency adequate to meet and maintain ~~minimum soil moisture of 12%. Moisture content can be verified by lab samples or moisture probe~~fugitive dust control requirements of all relevant air quality management entities.

Response to Comment GP-4-23

The commenter requests revising Mitigation Measure MM-AQ-2b to remove the wind break requirement. The wind break requirement identified in Mitigation Measure MM-AQ-2b is a standard BAAQMD mitigation requirement for projects with construction emissions in excess of their significance thresholds.

Response to Comment GP-4-24

The commenter has not provided the County with any data that would allow quantification of the amount of reduction of emissions from existing operations. Accordingly, the County has decided not to make the suggested change to the text of the PEIR.

Response to Comment GP-4-25

As described on page 1-8 in *History since 2001* of the Draft PEIR, the provisions of the program-level APP were incorporated into the program-level mitigation measures presented in Section 3.4, *Biological Resources*, of the EIR. The second paragraph of *2007 Settlement Agreement* on page 3.4-7 of the Draft PEIR has been revised as shown below.

> As an alternative to the NCCP called for in the Settlement Agreement, the County prepared this PEIR with mitigation measures to provide a framework for review and approval of wind projects in the APWRA and to promote conservation measures to benefit avian species. As described in Section 1.2.4, *Conditional Use Permits*, the County ~~has~~ developed a draft *Avian Protection Program* (APP) to provide a framework and process for wind energy projects to ~~comply with~~address applicable statutes (e.g., MBTA and BGEPA) through the repowering process. The APP provided a broad evaluation of existing environmental conditions, bird use, and avian fatalities in the program area. It focused on avian mortality associated with repowering projects—specifically construction, operation, monitoring, and mitigation. The key provisions of the APP were ~~have been~~ incorporated into the program-level mitigation measures of this PEIR ~~as impacts and mitigation measures~~. Project proponents will be expected to develop project-specific APPs, incorporating mitigation, monitoring, and adaptive management strategies as set forth in this PEIR.

Response to Comment GP-4-26

Please see Response to Comment GP-4-1 for a response to this comment.

Response to Comment GP-4-27

The commenter refers to a quantification of temporary impacts included in a project description that NextEra submitted to the County; however, the table in which the temporary impacts is quantified is not consistent with more specific descriptions provided in the text of that project description. Specifically, the bulk of the temporary impact acreage is attributed to "cut-and-fill," which presumably consists largely of turbine foundations and grading for roadways. Because these impact mechanisms are described and quantified individually by activity, no change has been made to the text of the Draft PEIR.

Response to Comment GP-4-28

The County has considered this comment from the applicant, and, exercising its own independent judgment as the Lead Agency, has decided not to make the suggested change to the text of the PEIR.

Response to Comment GP-4-29

The commenter suggests revisions to Mitigation Measure BIO-1d. Mitigation Measure BIO-1d was developed to be consistent with the avoidance, minimization, and mitigation measures set forth in the EACCS.

Response to Comment GP-4-30

The requested change is not appropriate for the impact discussion; however, these issues are addressed in *Habitat Enhancements* on page 1-9 if the Draft PEIR.

Response to Comment GP-4-31

Impact BIO-4a-1, like Impacts BIO-4a-2, BIO-4b, and BIO-4c, is identified in the PEIR as a significant impact. As required by CEQA, the PEIR identifies available mitigation measures that will reduce the impact to a less-than-significant level. These mitigation measures are listed below.

Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

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

Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

Mitigation Measure BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle

Mitigation Measure BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle

Mitigation Measure BIO-4b reflects standard mitigation practice for valley elderberry longhorn beetle and would apply only, as stated in Mitigation Measure BIO-4b, “if elderberry shrubs cannot be avoided and protected as outlined in Mitigation Measure 4a,” in which case the impact would be significant if mitigation were not implemented. The commenter’s suggested change to the mitigation measure would defer the mitigation to a decision by another agency. Mitigation Measure BIO-4b presents the required detail on the mitigation in order to show how the impact would be reduced to a less-than-significant level.

Response to Comment GP-4-32

The commenter suggests that Mitigation Measure BIO-5a on page 3.4-73 of the Draft PEIR should be revised to refer to NPDES construction general requirements for stormwater. The intent of this mitigation measure is to avoid and minimize impacts on special-status amphibians. Applicants must still adhere to NPDES requirements, but compliance with stormwater management is not the intent or focus of this mitigation measure; rather, the intent is to limit ground-disturbing activities to avoid and minimize impacts on special-status amphibians when they may be most active. The first paragraph of Mitigation Measure BIO-5a on page 3.4-73 of the Draft PEIR has been revised as shown below.

All project proponents will ensure that BMPs and other appropriate measures, in accordance with measures developed for the EACCS, be incorporated into the appropriate design and construction documents. *Implementation of some of these measures will require that the project proponent obtain incidental take permits from USFWS (California red-legged frog and California tiger salamander) and from CDFW (California tiger salamander only) before construction begins.* Additional conservation measures or conditions of approval may be required in applicable project permits (e.g., ESA or CESA incidental take authorization). The applicant will comply with the State of California State Water Resources Control Board NPDES construction general requirements for stormwater.

Response to Comment GP-4-33

The commenter states that the monitoring of restoration areas should be conducted during a longer period to allow for the detection of invasive species. The commenter also requests that additional text be added to the mitigation measure regarding drought conditions. In response to this comment, Mitigation Measure BIO-5c, on pages 3.4-74 and 3.4-75 of the Draft PEIR has been revised as shown below.

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 permanent roads and turbine pad areas are restored to preproject 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. Imported fill soils will be limited to weed-free topsoil similar in texture, chemical composition, and pH to soils found at the restoration 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 program area and should include native or naturalized, noninvasive species sourced within the project area or from the nearest available location.
- 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~~October) for up to 3 years following the year of restoration. The restoration will be considered successful when the percent cover for restored areas is 70% absolute cover of the planted/seeded species compared to the percent absolute cover of nearby reference sites. No more than 5% relative cover of the vegetation in the restoration areas will consist of invasive plant species rated as “high” in Cal-IPC’s California Invasive Plant Inventory Database (http://www.cal-ipc.org). Remedial measures prescribed in the plan will include supplemental seeding, weed control, and other actions as determined necessary to achieve the long-term success criteria. Monitoring may be extended if necessary to achieve the success criteria or if drought conditions preclude restoration success. 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. The project proponent will provide evidence that CDFW has reviewed and approved the Grassland Restoration Plan. Additionally, the project proponent will provide annual monitoring reports to the County by January 31~~August 1~~ of each year, summarizing the monitoring results and any remedial measures implemented (if any are necessary) during the previous year.

Response to Comment GP-4-34

The commenter states that the reporting period should be extended commensurate with the revisions suggested in comment GP-4-33. The County agrees with this comment and has modified Mitigation Measure BIO-5c as shown in Response to Comment GP-4-33.

Response to Comment GP-4-35

The commenter suggests a change to Mitigation Measure BIO-8a on page 3.4-86 of the Draft PEIR regarding when suitable nesting trees for nesting birds should be removed. As described in the second paragraph of *Impacts and Mitigation Measures* on page 3.4-56 of the Draft PEIR, mitigation measures for biological resources were developed to be consistent with the avoidance, minimization, and mitigation measures set forth in the EACCS. Because Mitigation Measure BIO-8a uses typical nesting periods, the County has decided not to make the suggested change to the text of the PEIR. However, the word "typically" has been added to the date range as shown in Response to Comment FA-1-13.

Response to Comment GP-4-36

In response to this comment, the first paragraph of Mitigation Measure BIO-15 on page 3.4-134 of the Draft PEIR has been revised as shown below.

Mitigation Measure BIO-15: Compensate for the loss of alkali meadow habitat

If alkali meadow habitat is filled or disturbed as part of a repowering project, the project proponent will compensate for the loss of this habitat to ensure no net loss of habitat functions and values. Compensation ratios will be based on site-specific information and determined through coordination with state and federal agencies (CDFW, USFWS, USACE). Unless specified otherwise by a resource agency, t~~T~~he compensation will 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, offsite restoration, and mitigation credits. A restoration and monitoring plan will be developed and implemented. The plan will describe how alkali meadow habitat will be created and monitored.

Response to Comment GP-4-37

The commenter requests a change to the description of grading activities associated with postconstruction restoration in Impact BIO-17b. The text of Impact BIO-17b on page 3.4-138 of the Draft PEIR has been revised as shown below.

Ground-disturbing activities would result in the permanent loss of common habitats as a result of constructing new permanent facilities and the temporary loss of common habitats as a result of constructing temporary facilities and landscape reclamation. These activities would create minor changes in total acreage of common habitats in the project area, primarily in the annual grassland plant community.

All lands disturbed by infrastructure installation or removal would be returned to preproject conditions. At each reclamation site, the topography would be contour graded~~ to match the contours of the natural surrounding landscape~~ (if necessary and if environmentally beneficial), stabilized, and reseeded with an appropriate seed mixture~~, and allowed to become revegetated without assistance~~ to maintain slope stability. Reclamation activities would be guided by a reclamation plan developed in coordination with the County and other applicable agencies.

This impact would be less than significant. No mitigation is required.

Response to Comment GP-4-38

The commenter correctly points out that the historical resource described in Impact CUL-1b on page 3.5-17 of the Draft PEIR is not in fact within the project area. The text of the impact discussion has been revised as shown below.

Impact CUL-1b: Cause a substantial adverse change in the significance of a historic resource—Golden Hills Project (less than significant with mitigation)

The Golden Hills Project may cause a substantial adverse change in the significance of ~~a~~ three potential historical resources: P-01-000163/CA-ALA-441H, a historic-era ranch complex consisting of five separate features; P-01-000177/CA-ALA-455H, the Santucci Property Homestead, a historic-era ranch complex with standing buildings; and P-01-010957, the remnants of an abandoned corral. ~~This resource is the remains of an earthen dam that measured 30 feet long, 12 feet wide, and 10 feet high. Per the 1999 recordation, the associated pond, located behind it, had dried up.~~ No other features are recorded or were observed during the Google Earth remote reconnaissance survey by the architectural historian in June 2013.

~~Dam #3 has not been determined eligible to the CRHR and NRHP.~~ No determination regarding eligibility for inclusion in the CRHR and NRHP has been made for any of the three resources. However, Section 15064.5 states:

> The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register or historical resources, or identified in an historical resources survey does not preclude a lead agency from determining that the resource may be an historical resources as defined in Public Resources Code section 5020.1(j) or 5024.1

Should the proposed project require the demolition, destruction, or alteration of these resources or ~~its~~ their immediate surroundings such that the significance of the resource is materially impaired, then a substantial adverse change would result. Implementation of Mitigation Measure CUL-1a would reduce this impact to a less-than-significant level by avoiding the historic resources. If avoidance is infeasible, implementation of Mitigation Measure CUL-1b would be employed. Because the ~~dam is an engineered feature~~two historic-era ranch properties and the corral are landscape features, ~~an~~ Historic American Landscapes Survey (HALS) ~~HAER~~ would be appropriate documentation to reduce this impact to a less-than-significant level.

Response to Comment GP-4-39

The commenter suggests revising Table 3.7-1 to more clearly show that the concentrations listed in the left column apply to the values in the right column of the table. For clarification for the reader of the PEIR, Table 3.7-1 on page 3.7-9 of the Draft PEIR has been revised as shown below.

Table 3.7-1. Lifetimes and Global Warming Potentials of Several Greenhouse Gases

Greenhouse Gases	Global Warming Potential (100 years)	Lifetime (years)	2005 Atmospheric Abundance
CO_2 ~~(ppm)~~[a]	1	50–200	379 ppm
CH_4 ~~(ppb)~~	25	12	1,758–1,874 ppb
N_2O ~~(ppb)~~	298	114	323–324 ppb
HFC-23 ~~(ppt)~~	14,800	270	18 ppt
HFC-134a ~~(ppt)~~	1,430	14	64 ppt
HFC-152a ~~(ppt)~~	124	1.4	3.9 ppt
SF_6 ~~(ppt)~~[a]	22,800	3,200	7.1–7.5 ppt

Sources: Intergovernmental Panel on Climate Change 2007b; Carbon Dioxide Information Analysis Center 2013; National Oceanic and Atmospheric Administration 2013.

CF = hydrofluorocarbons.
CH_4 = methane.
CO_2 = carbon dioxide.
N_2O = nitrous oxide.
~~ppb = parts per billion.~~
ppm = parts per million by volume.
ppb = parts per billion by volume.
ppt = parts per trillion by volume.

Response to Comment GP-4-40

The commenter asks whether the calculations for concrete sinks account for the reduction in concrete associated with removing the old turbines/infrastructure that is no longer needed and how this reduction would reduce the amount of CO_2 being reabsorbed by the existing turbines/infrastructure. The analysis presented in the Draft PEIR does not include potential reductions in CO_2 reabsorption (i.e., increases in CO_2 emissions) associated with reduced concrete carbonation, as it is currently unknown how many cubic yards of concrete associated with the existing infrastructure would be removed. While this would result in a minor increase in GHG emissions due to the loss of cement that would absorb CO_2, this minor increase in GHG emissions would not be sufficient to change the findings reported in the Draft PEIR. No revisions to the Draft PEIR are required.

Response to Comment GP-4-41

The difference between two A-weighted values is expressed as "dB" not "dBA." A decibel is an expression of a ratio. Similarly, a decibel change expresses the ratio that a sound level has changed, making expression of a decibel change as "dBA" incorrect. The third paragraph of *Background Information on Noise* on page 3.11.1 of the Draft PEIR has been revised as shown below.

> In general, human sound perception is such that a change in sound level of 1 dB cannot typically be perceived by the human ear, a change of 3 dB is barely noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level when comparing similar sounds (i.e., traffic to traffic).

Response to Comment GP-4-42

In response to this comment, the first paragraph of *Other Factors Related to Wind Turbines* on page 3.11-3 of the Draft PEIR has been revised as shown below.

> Operating wind turbines can generate two types of sound: mechanical sound from components such as gearboxes, generators, yaw drives, and cooling fans; and aerodynamic sound from the flow of air over and past the rotor blades. Modern wind turbine design has greatly reduced mechanical sound, which is generally unnoticeable in comparison with the aerodynamic sound, which is often described as a "swishing" or "whooshing" sound. The International Standard IEC 61400-11 for wind turbine noise assessment provides a requirement for evaluating tonality close to the turbine. Far field tonality at typical residential distances may be evaluated using a variety of methods; however, if a tone is not present at the IEC test location it should not materialize at the residence. Tones are then divided into categories of prominent tone, audible tone, or no tone~~.~~ (Illingworth & Rodkin 2006~~.~~).

Response to Comment GP-4-43

In response to this comment, the third and fourth paragraphs of *Other Factors Related to Wind Turbines* on page 3.11-4 of the Draft PEIR have been revised as shown below.

> Wind turbines produce a broadband sound (i.e., the sound occurs over a wide range of frequencies, including low and high frequencies). Low-frequency sounds are in the range of 20–100 Hz, and infrasonic sound (or *infrasound*) is low-frequency sound of less than 20 hertz. Compared with higher frequency sound, low-frequency sound propagates over longer distances, is transmitted through buildings more readily, and at high levels can excite structural vibrations (e.g., rattling windows or doors). The threshold of perception, in decibels, also increases as the frequency decreases. For example, in the frequency range where humans hear best (in the low kilohertz), the threshold of hearing is at about 0 dB, but at a frequency of only 10 Hz, the threshold of hearing is at about 100 dB (Rogers et al. 2006a).
>
> Older wind turbines—particularly those in which the blades were on the downwind side of the tower—produced more low-frequency sound because their towers blocked wind flow, causing the blades to pass through more turbulent air. Modern, upwind turbines produce a broadband sound that includes low-frequency sounds, but not at significant levels. A primary cause for low-frequency sounds in modern turbines is the blade passing through ~~the change in air flow at the front of the tower, and this can be aggravated by~~ unusually turbulent wind conditions. ~~This effect is generally referred to as blade amplitude modulation because the aerodynamic noise generated by the blades (the "swishing" sound) is modulated as the turbine blades pass through uneven air velocities.~~ The uneven air that causes this effect may be due to interaction of other turbines, excessive wind shear, or topography (Bowdler 2008). These factors may also contribute to periodic increases in the prominence of blade swish.

Response to Comment GP-4-44

The County may use any standards deemed reasonable and appropriate for the assessment of impacts under CEQA. The County is not limited to the use of current County regulatory requirements. Although the standards listed in the CUP are not a regulatory requirement, they have historically been used by the County in the assessment of wind turbine noise impacts. Accordingly, it is reasonable and acceptable for the County to continue to use these standards in the assessment of noise impacts for this project. The recent U.S Department of Energy guidance document cited in this comment does, however, present substantial evidence that measuring C-weighted sound levels at typical residential distances from a turbine is problematic, and variation in dBC levels were not found to correlate with wind turbine operations. The challenge with measuring C-weighted sound levels at residential setback distances is related to wind-induced microphone error where wind blowing through the microphone windscreen causes low-frequency sound energy to substantially increase. The microphone is therefore measuring low-frequency sound energy induced by the microphone and windscreen rather than the wind turbine itself. The practical result of this is that a C-weighted sound level measured at a residential distance does not accurately represent the sound level generated by a nearby wind turbine. In addition, dBC is currently not commonly used as a measure or indicator of community response to noise from wind turbines. Accordingly, the County agrees that C-weighting should not be used to assess noise impacts or noise compliance. All references to C-weighting have been removed from the impact assessment and Mitigation Measure NOI-1. For reasons discussed in Response to Comment GP-4-46 this does not change any noise impact conclusions identified in the noise chapter. The text and table following Table 3.11-5 in *Wind Turbine Noise* on page 3.11-10 of the Draft PEIR have been deleted as shown below.

> The proposed program would replace the existing turbines (first- and second-generation turbines) with fewer and larger current-generation turbines. Section 2.3 of this Program EIR, *Wind Turbine Technology*, provides a description and comparison of existing and proposed turbines. The specific types or sound data of current generation wind turbines to be used in the program area are not known and, therefore, the levels of noise produced by the installation of new turbines cannot be specifically determined. However, noise produced by current generation turbines such as the REpower MM 92 turbine and the Vestas V90 turbine are known to produce a sound level of about 44 dBA at 1,000 feet (Solano County 2011). Continuous operation over a 24-hour period would result in about 50 dBA (L_{dn}) at 1,000 feet. At any given receptor location, the received noise level from turbine operation could be potentially influenced by several turbines, depending on the geometric relationship between the turbines and the receptor. Table 3.11-5 provides an indication of potential received noise levels expressed in dBA (L_{dn}) based on the distance to a receiver and the number of turbines influencing noise received at the receptor. The table also highlights (using shading) the distances within which the County standard of 55 dBA (L_{dn}) would be exceeded. Under the assumption that up to 10 turbines could affect the received noise level at a receptor, the results in Table 3.11-5 indicate that the County noise standard of 55 dBA (L_{dn}) could be exceeded within about 1,750 feet of a receptor.

Table 3.11-5. Turbine Noise Level, dBA (L_{dn}), as a Function of Distance and Number of Turbines

	Number of Turbines Influencing the Received Noise Level						
Distance (feet)	1	2	3	4	5	7	10
500	56	59	61	62	63	64	66
550	55	58	60	61	62	63	65
750	52	55	57	58	59	60	62
1,000	50	53	55	56	57	58	60
1,150	49	52	54	55	56	57	59
1,250	48	51	53	54	55	56	58
1,400	47	50	52	53	54	55	57
1,500	46	49	51	52	53	54	56
1,750	45	48	50	51	52	53	55
2,000	44	47	49	50	51	52	54
2,500	42	45	47	48	49	50	52
3,000	40	43	45	46	47	48	50

Note: Based on simple geometric attenuation of 6 dB per doubling of distance.

~~C-weighted sound levels provide a measure of low frequency sound energy associated with operation of a wind turbine. C-weighted sound levels for the REpower MM 92 turbine and the Vestas V90 are about 10 dB higher than A-weighted sound levels. The C-weighted county standard for wind turbines is 70 dBC (L_{dn}).~~

~~Table 3.11-6 provides an indication of potential received noise levels expressed in dBC (L_{dn}) based on the distance to a receiver and the number of turbines influencing noise received at the receptor. The table also highlights distances within which the County standard of 70 dBC (L_{dn}) would be exceeded. Under the assumption that up to 10 turbines could affect the received noise level at a receptor, the results in Table 3.11-6 indicate that the County noise standard of 70 dBC(L_{dn}) could be exceeded within about 1,000 feet of a receptor.~~

~~Table 3.11-6. Turbine Noise Level, dBC (L_{dn}), as a Function of Distance and Number of Turbines~~

	~~Number of Turbines Influencing the Received Noise Level~~						
~~Distance (feet)~~	~~1~~	~~2~~	~~3~~	~~4~~	~~5~~	~~7~~	~~10~~
~~500~~	~~66~~	~~69~~	~~71~~	~~72~~	~~73~~	~~74~~	~~76~~
~~550~~	~~65~~	~~68~~	~~70~~	~~71~~	~~72~~	~~73~~	~~75~~
~~650~~	~~64~~	~~67~~	~~69~~	~~70~~	~~71~~	~~72~~	~~74~~
~~700~~	~~63~~	~~66~~	~~68~~	~~69~~	~~70~~	~~71~~	~~73~~
~~800~~	~~62~~	~~65~~	~~67~~	~~68~~	~~69~~	~~70~~	~~72~~
~~1,000~~	~~60~~	~~63~~	~~65~~	~~66~~	~~67~~	~~68~~	~~70~~
~~2,500~~	~~52~~	~~55~~	~~57~~	~~58~~	~~59~~	~~60~~	~~62~~
~~3,000~~	~~50~~	~~53~~	~~55~~	~~56~~	~~57~~	~~58~~	~~60~~

Similarly, the second bullet of *Determination of Significance* on page 3.11-11 of the Draft PEIR has been deleted as shown below.

In accordance with Appendix G of the State CEQA Guidelines and the County conditions of approval for the existing turbine operations, program Alternative 1, program Alternative 2, the Golden Hills project, or the Patterson Pass project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Exposure of residences to noise from new wind turbines in excess of 55 dBA (L_{dn}) where wind turbine noise is currently less than 55 dBA (L_{dn}). In the situation where the dwelling unit is on the same parcel being leased for windfarm, 65 dBA (L_{dn}) is used as the threshold.
- ~~Exposure of residences to noise from new wind turbines in excess of 70 dBC (L_{dn}) where wind turbine noise is currently less than 70 dBC (L_{dn}).~~
- Exposure of residences to a daily noise increase in L_{dn} value of more than 5 dB from the addition of new wind turbines where the existing noise level is in excess of 55 dBA (L_{dn}). In the situation where the dwelling unit is on the same parcel being leased for windfarm, 65 dBA (L_{dn}) is used as the threshold.
- Exposure of residences to equipment noise associated with construction activities that exceed Alameda County noise ordinance standards (Table 3.11-3) during nonexempt hours (7 p.m. to 7 a.m. on weekdays and 5 p.m. to 8 a.m. on Saturday and Sunday).

Finally, numerous minor revisions to eliminate C-weighting from the analysis have been made throughout the chapter; however, to avoid excessive reproduction of text, those changes are not repeated here. They can be reviewed in the underline/strikeout version of the PEIR that has been provided on CD with the Final PEIR.

Response to Comment GP-4-45

The County agrees that the paragraph immediately following Table 3.11-3 on page 3.11-7 of the Draft PEIR is not applicable to the proposed project. The paragraph has been removed as shown below. The change does not affect any impact conclusions in the Draft PEIR.

> ~~The County Zoning Ordinance (County General Code, Chapter 17) restricts noise from commercial activities by prohibiting any use that would generate a noise or vibration that is discernible without instruments beyond the property line. This performance standard does not apply to transportation activities or temporary construction work.~~
>
> The provisions of the ordinance do not apply to noise sources associated with construction, provided the activities do not take place before 7 a.m. or after 7 p.m. on any day except Saturday or Sunday, or before 8 a.m. or after 5 p.m. on Saturday or Sunday.

Response to Comment GP-4-46

The County may use any standards deemed reasonable and appropriate for the assessment of impacts under CEQA. The County is not limited to the use of current County regulatory requirements. Although the standards listed in the CUP are not a regulatory requirement, they have historically been used by the County in the assessment of wind turbine noise impacts. Accordingly, it is reasonable and acceptable for the County to continue to use these standards in the assessment of noise impacts for this project. However, for reasons discussed in Response to Comment GP-4-44, the County agrees that C-weighted sound levels should not be used to assess noise impacts. Accordingly, the 70 dBC (Ldn) noise metric has been removed from this assessment and noise compliance requirements specified in Mitigation Measure NOI-1. It is important to note that the difference between dBA and dBC is typically less than 15 dB for modern wind turbines. Consequently, the 55 dBA threshold would be exceeded before the 70 dBC threshold is exceeded. This means that the 55 dBA threshold governs the impact conclusion and makes the 70 dBC threshold irrelevant. Removing the 70 dBC (Ldn) threshold, therefore, does not change any impact conclusions, does not alter protection to residences from noise provided by Mitigation Measure NOI-1, and does not result in a relaxation of the noise significance threshold. Mitigation Measure NOI-1 on pages 3.11-12 and 3.11-13 of the Draft PEIR has been revised as shown below.

> **Mitigation Measure NOI-1: Perform project-specific noise studies and implement measures to comply with County noise standards**
>
> The applicant for any proposed repowering project will retain a qualified acoustic consultant to prepare a report that evaluates noise impacts associated with operation of the proposed wind turbines. This evaluation will include a noise monitoring survey to quantify existing noise conditions at noise sensitive receptors located within 2,000 feet of any proposed turbine location. This survey will include measurement of the daily A-weighted ~~and C-weighed~~ L_{dn} values over a 1-week period and concurrent logging of wind speeds at the nearest meteorological station. The study will include a site-specific evaluation of predicted operational noise levels at nearby noise sensitive uses. If operation of the project is predicted to result in noise in excess of 55 dBA (L_{dn}) where noise is currently less than 55 dBA (L_{dn})~~,~~ or result in a 5 dB increase where noise is currently greater than 55 dBA(L_{dn}), ~~or result in noise that exceeds 70 dBC (L_{dn}),~~ the applicant will modify the project, including selecting new specific installation sites within the program area, to ensure that these performance standards will not be exceeded.
>
> Methods that can be used to ensure compliance with these performance standards include but not limited to increasing the distance between proposed turbines and noise sensitive uses and the use of alternative turbine operational modes to reduce noise. Upon completion of the evaluation, the project applicant will submit a report to the County demonstrating how the project will comply with

these performance standards. After review and approval of the report by County staff, the applicant will incorporate measures as necessary into the project to ensure compliance with these performance standards.

Response to Comment GP-4-47

Please see Responses to Comments GP-4-44 and GP-4-46 for a response to this comment regarding use of dBC levels.

Response to Comment GP-4-48

In response to this comment, the second paragraph of *Construction Noise* on page 3.11-11 of the Draft PEIR has been revised as shown in Response to Comment GP-4-46.

Please see also Response to Comment GP-4-44.

Response to Comment GP-4-49

Please see Responses to Comments GP-4-44 and GP-4-46 for a response to this comment regarding use of dBC levels.

Response to Comment GP-4-50

Please see Responses to Comments GP-4-44 and GP-4-46 for a response to this comment regarding use of dBC levels.

Response to Comment GP-4-51

Please see Responses to Comments GP-4-44 and GP-4-46. With regard to C-weighting, no changes to the Draft PEIR are required. The suggested revision to the second paragraph of Mitigation Measure NOI-1 on page 3.11-13 of the Draft PEIR is appropriate and has been implemented as shown below. The suggested text change regarding selecting new specific installation sites is not necessary since selecting new sites is inherent in the process of "increasing the distance between proposed turbines and noise sensitive areas."

Response to Comment GP-4-52

Please see Responses to Comments GP-4-44 and GP-4-46 for a response to this comment regarding use of dBC levels.

Response to Comment GP-4-53

Please see Responses to Comments GP-4-44 and GP-4-46 for a response to this comment regarding use of dBC levels.

Response to Comment GP-4-54

Please see Responses to Comments GP-4-44 and GP-4-46 for a response to this comment regarding use of dBC levels.

Response to Comment GP-4-55

The commenter notes that continued operation of the existing turbines would generate wind energy and reduce GHG emissions concomitant with the amount of wind energy generated by those turbines, and that, consequently, not all the benefit of the proposed program would be eliminated by implementing the No Repowering, Reauthorization of Existing CUPs alternative. Accordingly, the discussion of *Greenhouse Gas Emissions* in Section 4.2.1, *No Project—No Repowering, Reauthorization of Existing CUPs*, on page 4-22 of the Draft PEIR has been revised as shown below.

> The No Project—No Repowering, Reauthorization of Existing CUPs alternative would not generate any short-term construction-related GHG emissions. ~~The~~ However, the full annual GHG emissions reduction of approximately 97,000 metric tons of CO_2e associated with the proposed program would not occur under this alternative, although wind energy would still be generated and GHG emissions would be reduced concomitant with the amount of wind energy generated by those turbines. This alternative would have no significant impact on GHG emissions.

Response to Comment GP-4-56

The Draft PEIR makes the conclusion noted by the commenter, as stated in the discussion of *Hazards and Hazardous Materials* on page 4-22 of the Draft PEIR.

> Operational impacts associated with hazards and hazardous materials would be similar to those under the proposed program, with the exception of potential blade throw hazards. The potential blade throw hazard would be greater, because the existing old-generation turbines are subject to higher rates of structural failure than are new-generation turbines. Consequently, impacts related to hazards and hazardous materials under this alternative would be greater than under the proposed program.

Response to Comment GP-4-57

The commenter provides updated information on golden eagle fatalities recorded in the second year of postconstruction monitoring at the Vasco Wind Project in Contra Costa County. The County appreciates this information and has incorporated it into the Final PEIR as described in Master Response 4, *Estimated Avian Mortality Rates Methodology*. The commenter also states that the baseline (nonrepowered) rates in the Draft PEIR incorporate the lower rates for repowered areas (Diablo Winds and Buena Vista), and that the rates, consequently, are artificially reduced for areas where repowering has not yet occurred. The commenter is incorrect. As noted in the fifth paragraph of *Avian Fatality Analysis Methods* on page 3.4-52 of the Draft PEIR, the rates in the PEIR exclude the Diablo Winds and Buena Vista turbine rates.

Response to Comment GP-4-58

Comment noted. As soon as new data on adjusted bat fatality rates are available for year 2 of the Vasco Winds project, those data will be incorporated into management decisions by the County, as guided by the TAC. Mitigation Measures BIO-14a on page 3.4-127 and BIO-14b on pages 3.4-127 through 3.4-129 of the Draft PEIR have been revised as shown in Master Response 11, *Bat Impacts and Mitigation*.

E.7 EBZA Meeting

During an EBZA workshop and public hearing held on June 26, 2014, the public and board members commented on the projects and on the Draft PEIR. In some cases the commenter also submitted a comment letter covering the same issues as presented in their verbal comments; in such cases, the written comment and response is referenced here. Some comments were made by EBZA members during the workshop portion of the hearing; the remainder arose during the public comment portion. The comments are summarized and responses to those comments are presented below.

E.7.1 Commenter PH-1—Larry Gosselin, EBZA Board Member

Comment PH-1-1

The PEIR does not evaluate impacts on grazing, which would be economic and not only physical. For example, availability of money from wind leases could reduce the need for grazing income. Reduced grazing could affect supporting economic activities, such as supplies for ranch equipment. Should this analysis be added to the Final PEIR?

Response to Comment PH-1-1

The PEIR does address impacts of the proposed program and projects on agriculture in Section 3.2-7. However, the PEIR, as directed by CEQA Guidelines Section 15131, focuses on physical impacts, and would address economic effects to the extent that such effects could be shown to result in a physical impact. The PEIR presents information on existing grazing activity in the program area, but the impacts analysis, pursuant to CEQA Guidelines Appendix G, focuses on effects on prime farmland. Grazing activity would not be substantially physically affected by the proposed program and projects, as grazing can occur in conjunction with wind energy generation. An analysis of the extent to which the availability of income from wind energy generation leases would reduce incentives to continue grazing activity would be speculative for CEQA purposes; therefore, pursuant to CEQA Guidelines Section 15145, this issue has not been addressed in the PEIR.

Comment PH-1-2

Solar panels at turbine bases might be more effective than gravel as a deterrent for ground squirrel activity and would generate more “green” energy. Should this be added as a mitigation measure?

Response to Comment PH-1-2

This suggestion has been considered and may be suggested in the future to future applicants.

Comment PH-1-3

Other wind resource areas use radar and braking systems for target (e.g., raptor) detection and individual turbine curtailment. Should that approach be considered as a mitigation option in the APWRA?

Response to Comment PH-1-3

Real-time turbine curtailment is addressed in Master Response 10, *Adaptive Management*.

Comment PH-1-4

What are the future effects of leaving turbine infrastructure (i.e., foundations) buried onsite?

Response to Comment to PH-1-4

Resource agencies have in many cases requested that turbine foundation not be removed to minimize habitat disturbance during decommissioning. As noted on page 2-11 of the PEIR, during site reclamation, "Some facilities (e.g. roadways, turbine footings) may be left in place if doing so is deemed to be more protective of natural resources than removal."

E.7.2 Commenter PH-2—Jon Harvey, EBZA Chair

Comment PH-2-1

The commenter had questions regarding make-up of the TAC and how that would be decided. Some of these questions were addressed at the meeting by County staff.

Response to Comment PH-2-1

The make-up and responsibilities of the TAC are addressed in Master Responses 5, *Avian Fatality Monitoring Methodology*, and 6, *Technical Advisory Committee.*

E.7.3 Commenter PH-3—Juan Pablo Gallan, Save Mount Diablo

A comment letter was submitted by this commenter (Comment Letter NGO-2). Where verbal comments were made in writing as well, the responses are identified by written comment number.

Comment PH-3-1

Will micro-siting of turbines be conducted for the Patterson Pass Project as well as for the Golden Hills Project?

Response to Comment PH-3-1

Siting of turbines for the Patterson Pass Project has already been conducted. Mitigation Measure BIO-11b sets forth the parameters of turbine siting.

Comment PH-3-2

Will any projects beyond those listed in Table 2-6 be tiered from the PEIR?

Response to Comment PH-3-2

Yes. Table 2-6 in the PEIR lists those projects of which the County is currently aware as projects that are or may be proposed. Other projects may be initiated within the parameters established subsequent to certification of the PEIR.

Comment PH-3-3

Will the golden eagle population be sustainable at the anticipated levels of mortality that would result from repowering?

Response to Comment PH-3-3

As shown in Response to Comment FA-1-9, the golden eagle population is considered to be stable but with reduced resilience as a consequence of turbine-related mortality. The mortality rates estimated to result from the two program alternatives—46% and 50%, respectively, for Alternatives 1 and 2—are anticipated to improve the population's resiliency overall. For a detailed discussion of golden eagle fatality estimates and the implications for the regional population, please refer to Response to Comment FA-1-6.

Comment PH-3-4

Are the compensatory mitigation measures to address loss of raptors prioritized in any way?

Response to Comment PH-3-4

Please see Response to Comment NGO-2-3, from this commenter, expressing the same comment.

E.7.4 Commenter PH-4—Bob Cooper, Dyer Road Resident

A comment letter was submitted by this commenter (Letter GP-1). Where verbal comments were made in writing as well, the responses are identified by written comment number. Please refer to that letter and the responses for a more detailed examination of the comments presented here.

Comment PH-4-1

The commenter expressed support for repowering and pointed out concerns including inadequate setbacks of existing turbines, potential for blade throw hazard, and risk of project-related wildlife fatalities.

Response to Comment PH-4-1

The commenter's support for the APWRA repowering and his concerns regarding potential impacts are acknowledged. The impacts have been addressed in the PEIR.

Comment PH-4-2

Figure 2-1 in the PEIR is missing several residences and a string of existing turbines.

Response to Comment PH-4-2

Please see Response to Comment GP-1-4. The figure has been revised for the Final PEIR.

E.7.5 Commenter PH-5—Karen Sweet, North Flynn Road Resident

Comment PH-5-1

The commenter expressed general support for repowering, citing reduced fire hazard associated with new-generation turbines.

Response to Comment PH-5-1

The commenter's support for repowering is acknowledged.

Comment PH-5-2

The commenter expressed a concern about possible traffic impacts that could interfere with commute and school traffic.

Response to Comment PH-5-2

As disclosed in Section 3.15, *Transportation/Traffic*, Mitigation Measure TRA-1 specifies development and implementation of a construction traffic control plan, which would reduce such potential impacts to a less-than-significant level.

Comment PH-5-3

The commenter expressed a hope that grassland reseeding would be undertaken in consultation with a rangeland specialist and that emphasis would be placed on plants appropriate to support grazing rather than experimental efforts involving native perennials.

Response to Comment PH-5-3

As set forth in Mitigation Measure BIO-5c, a Grassland Restoration Plan will be developed to address ground disturbance on a project-specific basis. Preparation of this plan will be undertaken by a qualified biologist in coordination with CDFW and subject to CDFW approval.

Comment PH-5-4

The commenter expressed the hope that conservation planning would consider the agricultural economy, the cattle industry, and local landowners in developing conservation easements and other planning decisions.

Response to Comment PH-5-4

The mitigation measures focus on the amount of compensation. More detail about the implementation of conservation planning will be developed over time.

E.8 References Cited

E.8.1 Printed References

Brown, K., K. S. Smallwood, and B. Karas. 2013*. Vasco Avian and Bat Monitoring Project 2012–2013 Annual Report*. Final. September. Prepared by Ventus Environmental Solutions, Portland, OR. Prepared for NextEra Energy Resources, Livermore, CA.

Ellison, L. E. 2012. *Bats and Wind Energy—a Literature Synthesis and Annotated Bibliography*. U.S. Geological Survey Open-File Report 2012–1110.

Grodksy, S. M., M. Behr, A. Gendler, D. Drake, B. D. Dieterle, R. J. Rudd, and N. Walrath. 2011. Investigating the causes of death for wind turbine-associated bat fatalities. *Journal of Mammalogy* 92(5):917–925. American Society of Mammalogists. DOI: 10.1644/10-MAMM-A-404.1. Available: http://www.bioone.org/doi/full/10.1644/10-MAMM-A-404.1

Johnston, D. S., J. A. Howell, S. B. Terrill, N. Thorngate, J. Castle, J. P. Smith (H. T. Harvey & Associates); T. J. Mabee, J. H. Plissner, N. A. Schwab, P. M. Sanzenbacher, and C. M. Grinnell (ABR, Inc.). 2013. *Bird and Bat Movement Patterns and Mortality at the Montezuma Hills Wind Resource Area.* June. CEC-500-2013-015. Available: http://www.solanocounty.com/civicax/filebank/blobdload.aspx?blobid=10104. Prepared by H. T. Harvey & Associates. Prepared for the California Energy Commission.

Southern Tablelands Renewables. 2014. *Bushfires*. Available: http://southerntablelandsrenewables.org.au/faq/bushfires/. Accessed: September 4, 2014.

National Renewable Energy Lab National Wind Technology Center. 2013. *Reducing Bat Fatalities From Interactions with Operating Wind Turbines*. Fact Sheet. November. NREL/FS-5000-60427. Available: http://www.nrel.gov/docs/fy14osti/60427.pdf. Accessed: August 24, 2014.

Weller, T. J., and J. A. Baldwin, 2011. Using Echolocation Monitoring to Model Bat Occupancy and Inform Mitigations at Wind Energy Facilities. *The Journal of Wildlife Management* 9999:1–13; 2011; DOI: 10.1002/jwmg.260.

E.8.2 Personal Communications

Payne, Bill. Manager, Aviation Management, California Department of Forestry and Fire Protection. September 23, 2014—telephone conversation with Andrew Young, Alameda County Planning Department.

Appendix F
Historical Documents

Appendix F1

Draft Avian Protection Program

DRAFT

AVIAN PROTECTION PROGRAM

FOR THE

COUNTY OF ALAMEDA ALTAMONT PASS WIND RESOURCE AREA

PREPARED FOR:

County of Alameda
224 W. Winton Avenue, Rm. 111
Hayward, CA 94544
Contact: Sandra Rivera
510.670.5400

PREPARED BY:

ICF International
620 Folsom Street, Suite 200
San Francisco, CA 94107
Contact: Paola Bernazzani
916.501.0921

June 2013

ICF International. 2013. *Avian Protection Program for the County of Alameda Altamont Pass Wind Resource Area*. Draft. June. (ICF 00323.08.) San Francisco, CA. Prepared for County of Alameda, Hayward, CA.

Contents

Contents

Tables, Figures, and Maps

Acronyms and Abbreviations

ACAFMT	Alameda County Avian Fatality Monitoring Team
ACPs	advanced conservation practices
AMMs	adaptive management measures
APP	Avian Protection Program
APWRA	Altamont Pass Wind Resource Area
Audubon	Audubon Society
AWI	Altamont Winds Inc.
BACI	before-after-control-impact
BBS	Breeding Bird Survey
BCS	Bird Conservation Strategies
BGEPA	Bald and Golden Eagle Protection Act
Buena Vista	Buena Vista Wind Energy Project
CARE	Californians for Renewable Energy
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEC Guidelines	California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development
Center	California Raptor Center
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
COD	commercial operation date
County	County of Alameda
CPUC	California Public Utilities Commission
CUP	Conditional Use Permit
Diablo Winds	Diablo Winds Energy Project
Draft ECP Guidance	Draft Eagle Conservation Plan Guidance
ECP	Eagle Conservation Plan
EIR	Environmental Impact Report
enXco	enXco, Inc.
ESA	Federal Endangered Species Act
FAA	Federal Aviation Administration
FR	Federal Register
GPS	global positioning system
HCP	Habitat Conservation Plan

Acronyms and Abbreviations

km2	square kilometer
kW	kilowatt
LUPs	land use permits
MBTA	Migratory Bird Treaty Act
mi2	square mile
MW	megawatt
NCCP	Natural Community Conservation Plan
NextEra	NextEra Energy Resources, LLC
PEIR	Programmatic Environmental Impact Report
QAQC	Quality Control/Quality Assurance
SRC	Scientific Review Committee
SSP	species of special concern
TAC	Technical Advisory Committee
USC	U.S. Government Code
USFWS	U.S. Fish and Wildlife Service
WRA	Wind Resource Area

Purpose and Scope

The County of Alameda (the County) has prepared an Avian Protection Program (APP) that provides a framework and process for wind-energy development to comply with applicable statutes (e.g., the Migratory Bird Treaty Act [MBTA] and Bald and Golden Eagle Protection Act [BGEPA]) within the County portion of the Altamont Pass Wind Resource Area (APWRA), also referred to herein as the Project Area. This APP provides a broad evaluation of existing environmental conditions, bird use, and avian fatalities in the Project Area. It also describes subsequent, project-specific requirements that will streamline permitting and ensure that mitigation and minimization measures are consistent across the County. This APP focuses on the direct impact to avian species from the operation of repowered turbines in the Project Area. It will be included as an addendum to the Repowering Environmental Impact Report (EIR), which will address indirect effects of repowering such as displacement from habitat loss as well as effects from other repowering-related activities, such as construction or maintenance. The Repowering EIR will also address direct and indirect impacts to bat species.

The document is partitioned into two parts. Part 1 of the document addresses the programmatic framework of the effort. Part 2 establishes the goals of the APP as it applies to repowering projects and describes the project-specific measures that will need to be implemented by each project proponent in order to achieve these goals and to obtain a Conditional Use Permit (CUP) from the County. Together, these parts establish a program that mitigates unavoidable impacts to birds from repowering projects in compliance with the 2007 Settlement Agreement and with respect to federal, state, and county policy and regulations (See Section 1.3).

The APP provides requirements for project-specific analyses that will inform the siting, construction, operation, and decommissioning of wind-energy repowering. The APP provides a programmatic evaluation of bird use, existing turbine-related fatality, and estimated impacts based on a series of assumptions about how the Project Area will be repowered. It also includes analyses of eight focal species that were selected based on a) presence in the APWRA, b) the level of impact through collision with wind turbines, c) status as rare or sensitive species, and d) potential for population-level impacts from wind-energy development (See Section 1.2). Subsequent, site-specific Bird Conservation Strategies (BCS) will use this foundational analysis, along with site-specific information, to comply with the requirements of this APP and to streamline additional project-level permitting such as a programmatic eagle take permit (See Section 1.3.1.3). The Project Area for the APP encompasses the entire Alameda County portion of the APWRA (approximately 43,358 acres). The APP itself applies to all repowering projects in the Project Area, excluding the Diablo Winds Energy Project (Diablo Winds), which was constructed in 2004, and the FloDesign research project, which is currently in the planning stages. The APP is organized as follows:

- Part 1 – Programmatic Framework
    - Section 1.0 – Background on the APWRA and the regulatory setting as it applies to wind-energy facilities in the Project Area.
    - Section 2.0 – Existing conditions in the APWRA and its vicinity, including a description of bird use by focal species within the APWRA.
    - Section 3.0 – Impact assessment, including an estimate of future fatalities for the eight focal species based on a fully repowered scenario.

- Part 2 – Project-Specific Requirements
    - Section 4.0 – Preconstruction risk assessment.
    - Section 5.0 – Conservation measures to reduce impacts to birds, including avoidance and minimization and compensatory mitigation.
    - Section 6.0 – Post-construction monitoring and adaptive management.

PART 1
PROGRAMMATIC FRAMEWORK

1.0 Introduction

1.1 Background

In 1980, the California Energy Commission (CEC) identified the Altamont Pass region—spanning the northeast corner of Alameda County and the southeast corner of Contra Costa County—as a "wind resource area," part of a state-wide wind resource system for the production of alternative energy. In September 1998, an Alameda County Zoning Ordinance included wind-energy facilities as an acceptable use and this language was adopted into the County's General Plan as part of the East County Area Plan in 1997. Turbines have operated in the APWRA since the early 1980s.

Currently, two major issues affect the continued generation of wind energy in the APWRA: declining energy production and high avian mortality. Attrition of aging wind turbines (i.e., turbines break down and are not replaced) and the removal of turbines that present a high collision risk to birds have reduced the amount of energy produced overall. Most of the turbines operating in the APWRA were installed in the 1980s. These turbines have a 20-year operating life; many of the existing wind turbines have exceeded this lifespan but continue to operate. Most wind companies in the APWRA have not yet repowered; only one repowering project (Diablo Winds), consisting of 31 turbines, was constructed in the Project Area in 2004 (Map 1); the Vasco Winds repowering project began operation in the Contra Costa County portion of the APWRA in 2012. Two other repowering projects in the APWRA are in planning stages; Tres Vaqueros in Contra Costa County has completed California Environmental Quality Act (CEQA) documentation and is anticipated to go to construction in 2014 or 2015, and FloDesign in the Project Area is in the initial planning stages of installing a research project for a new turbine design.

Several state and federal regulations prohibit taking[1] various bird species (see Section 1.3). The operation of wind turbines are known to result in fatalities (California Energy Commission 1989; Howell and DiDonato 1991; Orloff and Flannery 1992; Erickson et al. 2001). Researchers initially identified turbine-related deaths for birds in the mid-1980s, giving rise to ongoing research to facilitate improvements in design, operational characteristics, and siting of wind turbines that could reduce the number of fatalities. The science associated with understanding collision risk for birds at wind-energy facilities continues to evolve.

In 2005, the County Board of Supervisors issued CUPs for the continued operation of wind turbines in the APWRA, concluding that the decision was categorically exempt from CEQA. Shortly thereafter,

[1] Defined by California Department of Fish and Game (Fish and Game Code §86) as: "To hunt, pursue, catch, capture or kill, or attempt to hunt, pursue, catch, capture, or kill." Under the federal Migratory Bird Treaty Act, "take" means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect (50 CFR 10.12). Under the Bald and Golden Eagle Protection Act, "take" includes to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest or disturb (50 CFR 22.3).

five chapters of the Audubon Society (Audubon) and Californians for Renewable Energy (CARE) petitioned the Alameda County Superior Court for a writ of mandate to set aside the County's issuance of the CUPs on various grounds, including that the action violated the County's General Code and CEQA. Beginning in January 2006, Audubon, CARE, and several wind-energy companies engaged in discussions to resolve issues related to the CUPs and wind-turbine operation in the APWRA. The outcome of these discussions was the 2007 Settlement Agreement between Audubon, CARE, and three of the four wind-energy companies then operating in the Project Area: SeaWest Power Resources[2], LLC (also referred to as AES Wind Generation), enXco, Inc. (enXco), and NextEra Energy Resources, LLC (NextEra).

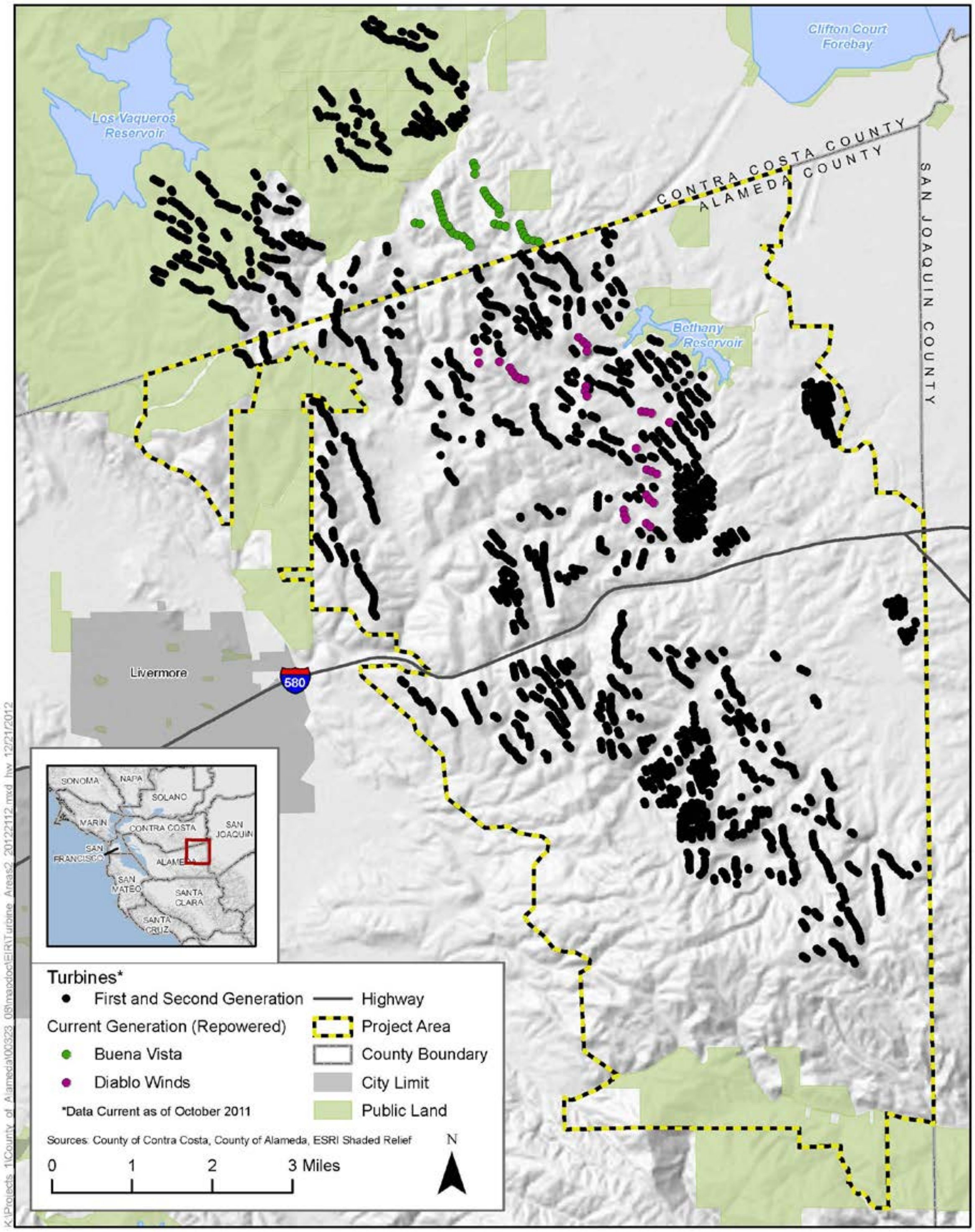
As a result of the 2007 Settlement Agreement, the CUPs of participating wind-energy companies were modified to include measures to reduce raptor turbine-related fatalities in the Project Area. The modified CUPs were approved by the County concurrently with the County's approval of the 2007 Settlement Agreement. The approval of the updated CUPs allowed the wind-energy companies to continue operation while implementing new minimization measures and working towards other provisions of the 2007 Settlement Agreement, including the long-term conservation of impacted species. The 2007 Settlement Agreement identified four species by which to measure the reduction in raptor fatalities against an established baseline: American kestrel (*Falco sparverius*), burrowing owl (*Athene cunicularia*), golden eagle (*Aquila chrysaetos*), and red-tailed hawk (*Buteo jamaicensis*).

The Diablo Winds repowering project in Alameda County and the Buena Vista Wind Energy Project (Buena Vista) in Contra Costa County provide the only two repowered projects in the APWRA for which avian fatality monitoring data are available.[3] Recent data from these projects indicate that current-generation wind turbines may provide a less-risky environment for raptors resulting in lower fatality rates. As such, repowering of all wind turbines in the APWRA has become a focus of recommendations by the APWRA Scientific Review Committee (SRC) (Altamont Pass Wind Resource Area Scientific Review Committee 2011) and a renewed goal for wind-energy companies and environmental stakeholders. However, repowering is not expected to eliminate avian turbine-related fatalities.

[2] SeaWest Power Resources sold all of its assets to FloDesign, Inc. in 2012.

[3] Vasco Winds began operation in January 2012 and monitoring results have not yet been compiled for the first year of operation.

Map 1. Wind Turbines in the Altamont Pass Wind Resource Area



1.2 Focal Species

Although all migratory and resident birds are expected to benefit from the minimization and mitigation measures prescribed in this APP, it specifically addresses eight focal species, including the four species addressed by the 2007 Settlement Agreement (listed above) as well as the barn owl (*Tyto alba)*, loggerhead shrike (*Lanius ludovicianus*), prairie falcon (*Falco mexicanus*), and Swainson's hawk (*Buteo swainsoni*). These additional species were selected based on the results of fatality monitoring within the APWRA (ICF International 2012a; Smallwood 2010) and include rare or special-status species with the potential to be impacted based on fatality monitoring (loggerhead shrike [California species of special concern [SSP]], prairie falcon [CDFW Watch List], Swainson's Hawk [listed as threatened under the California Endangered Species Act [CESA]) or species that experience particularly high fatality rates in the APWRA (barn owl) thus meeting the CEQA criteria for mandatory findings of significance (Section 15065)[4]. Focal species are analyzed to determine the potential effects of repowering the APWRA, but this APP supports the continued tracking and monitoring of all bird fatalities within the Project Area.

1.3 Regulatory Setting

Federal, state, and county regulations require protection for bird species. These regulations, and how they apply to repowering in the APWRA, are briefly summarized below.

1.3.1 Federal and State Regulations

1.3.1.1 Federal Endangered Species Act

The USFWS and the National Marine Fisheries Service have jurisdiction over species listed as threatened or endangered under Section 9 of the federal Endangered Species Act (ESA). The ESA protects listed species from *take*, which is broadly defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." For any project requiring a federal agency to take an action where by a listed bird species could be affected, the federal action agency must consult with USFWS in accordance with ESA Section 7. USFWS issues a Biological Opinion and, if the project does not jeopardize the continued existence of the listed species, an incidental take statement is provided. For projects with no federal nexus, proponents of the project affecting a listed species must consult with USFWS and apply for an incidental take permit under Section 10 of the ESA. Section 10 requires an applicant to submit a Habitat Conservation Plan (HCP) that specifies project impacts and mitigation measures. Based on avian use and fatality data (Appendix A), there are no ESA-listed bird species with the potential to be taken in the APWRA.

1.3.1.2 Migratory Bird Treaty Act

The MBTA (16 U.S. Government Code [USC] 703–712) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It protects migratory birds (over

[4] According to CEQA guidelines, a project is considered to have a significant effect on the environment if "it has the potential to… cause a fish or wildlife population to drop below self-sustaining levels" or if it "threaten(s) to eliminate a plant or animal community." (CEQA 15065(a)1).

1,000 species), their occupied nests, and their eggs (16 USC 703; 50 Code of Federal Regulations [CFR] 21; 50 CFR 10). Most actions that result in take—defined as hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof—are prohibited under the MBTA. Examples of permitted actions that do not violate the MBTA are the possession of a hunting license to pursue specific game birds, legitimate research activities, display in zoological gardens, bird-banding, and other similar activities. The U.S. Fish and Wildlife Service (USFWS) is responsible for overseeing compliance with the MBTA. Monitoring data in the APWRA suggest the potential for turbine related fatalities for multiple bird species protected under the MBTA. The *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines* (Land-based Wind Energy Guidelines; U.S. Fish and Wildlife Service 2012a) identify effective means of documenting measures to avoid and minimize the taking of birds listed under the MBTA and, while permits are not issued for take of these species, the USFWS will take such avoidance and minimization into account when employing its prosecutorial discretion. The Land-based Wind Energy Guidelines are described in more detail below in Section 1.3.2.1.

1.3.1.3 Bald and Golden Eagle Protection Act

The BGEPA (16 USC 668) prohibits take and disturbance of eagles and their nests. Take permits for birds or body parts are limited to religious, scientific, or falconry pursuits. However, the 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. In 2009, USFWS issued a final rule on new permit regulations that allow some disturbance of eagles "in the course of conducting lawful activities" including two new permit types: 1) individual permits that can be authorized in limited instances of disturbance and in certain situations where other forms of take may occur, such as human or eagle health and safety; and 2) programmatic permits that may authorize incidental take that occurs over a longer period of time or across a larger area (74 Federal Register [FR] 46836–46879). In April 2012, additional changes were proposed to the regulations governing eagle permitting (77 FR 22267, 2012).

USFWS's description of its 2009 rule suggests that physical take of an eagle will only be authorized if every avoidance measure has been exhausted. Golden eagles nest in the vicinity of the Project Area and have been killed by wind turbines in the APWRA. In 2011, the USFWS issued guidance regarding the development of an Eagle Conservation Plan (ECP) to comply with BGEPA and to receive take permits under the Act. Although project-level requirements in the APP (see Chapters 4- 6) generally adhere to the approach of the Draft ECP guidance, compliance with this APP is not meant to serve as a comprehensive vehicle for a programmatic take permit under BGEPA; additional advanced conservation measures in coordination with the USFWS may be required as well as analysis under NEPA, for the service to issue a programmatic eagle take permit for project proponents. The Draft ECP guidance is described in more detail in Section 1.3.2.3 below.

1.3.1.4 California Environmental Quality Act

CEQA declares that the State shall prevent the elimination of fish or wildlife species due to man's activities and ensure that wildlife populations do not drop below self-perpetuating levels (§ 21001(c)). Furthermore, mandatory findings of significant impact include substantial reduction in habitat of wildlife species, or if impacts cause a species population to drop below self-sustaining levels (§15065[a][1]). Research has indicated that APWRA is a population sink for golden eagles due to turbine related fatalities (Hunt and Hunt 2006), thereby suggesting that impacts to golden eagles in the Project Area must be fully mitigated under CEQA if feasible mitigation is available. Section 5 of this APP provides a summary of feasible mitigation.

1.3.1.5 California Endangered Species Act

California implemented CESA in 1984. The act prohibits the take of endangered and threatened species, except as authorized by special permits. Under CESA, *take* is defined as an activity that would directly or indirectly kill an individual of a species, but the definition does not explicitly include non-lethal harm, harassment, or habitat destruction. The California Department of Fish and Wildlife (CDFW) administers CESA and may issue a consistency determination under Section 2080.1 for species that are listed under both the ESA and CESA or a take permit under Section 2081. Fatality monitoring in the APWRA has documented one Swainson's hawk and one sandhill crane fatality, both listed as threatened under CESA. There have been no other documented fatalities of state-listed species in the APWRA.

1.3.1.6 California Fish and Game Code

Fully Protected Species

The California Fish and Game Code provides protection from take of a variety of vertebrate species, referred to as *fully protected species*. Section 3511 lists fully protected birds; and Section 4700 lists fully protected mammals. The California Fish and Game Code defines *take* as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Until recently, permits for take of fully protected species were only granted related to scientific research, and CDFW could not issue other types of take permits for fully protected species. However, in October 2011 the Governor signed a bill allowing CDFW to permit the incidental take of a fully protected species through a Natural Community Conservation Plan (NCCP) permit. The golden eagle and white-tailed kite are fully protected species that occur within the APWRA for which monitoring indicates the potential for turbine-related fatalities (ICF International 2012a; Smallwood 2010). No NCCP for the incidental take of these species due to wind turbine operation in the APWRA is in place or under development.

Sections 3503 and 3503.5 (Protection of Birds and Raptors)

Section 3503 of the California Fish and Game Code prohibits the killing of birds and the destruction of bird nests. Section 3503.5 prohibits the killing of raptor species and destruction of raptor nests. Typical violations include destruction of active nests as a result of tree removal and failure of nesting attempts (loss of eggs or young) due to disturbance caused by nearby human activity. Consultation with CDFW and appropriate permitting is required if construction activities or project operations will affect nesting birds. Several species of raptors, including American kestrel, red-tailed hawk, and burrowing owl, nest within the APWRA and have had turbine-related fatalities documented during monitoring activities (ICF International 2012a; Smallwood 2010).

1.3.2 Federal and State Guidelines

The USFWS has issued various guidelines to aid wind-energy developers in complying with the MBTA and BGEPA. The CEC and CDFW have also developed guidelines for the permitting and study of wind-energy developments to comply with state regulations. These guidelines and how they relate to this APP are summarized below.

1.3.2.1 U.S. Fish and Wildlife Service Guidelines for Land-Based Wind Development

On March 23, 2012, the USFWS released the final Land-Based Wind Energy Guidelines (U.S. Fish and Wildlife Service 2012a). They provide wind-energy developers with a recommended approach for complying with applicable laws and USFWS regulations to minimize impacts on wildlife species. The guidelines recommend a tiered approach:

- Tier 1 – Preliminary evaluation or screening of potential sites (landscape-scale screening of possible project sites)[5]
- Tier 2 – Site characterization (broad characterization of one or more potential project sites)
- Tier 3 – Pre-construction monitoring and assessments (site-specific assessments at the proposed project site)
- Tier 4 – Post-construction monitoring of effects (to evaluate fatalities and other effects)
- Tier 5 – Research (to further evaluate direct and indirect effects, and assess how they may be addressed)

In general, the guidelines emphasize the importance of careful site evaluation, risk assessment, and post-construction monitoring and research to avoid impacts to wildlife species and assess mitigation measures. The guidelines also include best management practices for turbine repowering and a recommended communication protocol for project proponents and the USFWS. The USFWS notes that voluntary communication and adherence to the guidelines, which are voluntary, will constitute evidence of due care with respect to avoiding, minimizing, and mitigating significant adverse impacts to species protected under the MBTA; it identifies Bird Conservation Strategies (previously termed Avian Protection Plans) as a means of documenting such avoidance, minimization, and mitigation measures. It will take such measures into account when exercising its discretion to enforce the MBTA.

1.3.2.2 Draft Eagle Conservation Plan Guidance

On February 8, 2011, the USFWS (2011) released the *Draft Eagle Conservation Plan Guidance* (Draft ECP Guidance), which provides recommendations for siting and permitting wind-energy projects consistent with BGEPA. In April of 2012, additional changes were proposed to the regulations governing eagle permitting (77 FR 22267, 2012). The USFWS developed the Draft ECP Guidance to resolve uncertainty associated with the Final Eagle Permit Rule (74 FR 46836, 2009), which provided a mechanism for permitting under the BGEPA. The Draft ECP Guidance provides a framework for satisfying requirements for a programmatic take permit under BGEPA. Because the operation of wind-energy facilities leads to ongoing (vs. one-time) impacts to eagles, all BGEPA permits for the wind industry that cover turbine operation are “programmatic” in nature (50 CFR 22.26). The Draft ECP Guidance proposes that proponents comply with BGEPA by:

- Conducting preconstruction assessments to identify eagle-use areas.
- Avoiding, minimizing, and, if necessary, compensating for impacts to eagles.
- Monitoring for impacts during project construction and subsequent turbine operation.

[5] Note that because the APP is focused on the repowering of existing facilities in the Project Area, rather than siting of new facilities, Tier 1 is not relevant to this effort.

The Draft ECP Guidance addresses the full process of project development from the earliest phase of conceptual planning, including turbine siting, to minimization through the improved operation of turbines to compensatory mitigation and monitoring. This overall process includes the following five stages similar to those proposed by the draft Land-Based Wind Development Guidelines:

- Stage 1—Landscape-scale site assessments
- Stage 2—Site-specific assessments
- Stage 3—Risk analysis
- Stage 4—Development of advanced conservation practices
- Stage 5—Post-construction monitoring

The USFWS specifies that the Draft ECP Guidance is not a requirement but recommends that proposed alternatives be closely coordinated with USFWS to meet the regulatory standards for permit issuance. For proponents engaged in development of an HCP under Section 10 of the ESA, the HCP may serve as a permit under BGEPA, as long as the avoidance, minimization, and other measures in the HCP meet BGEPA permit-issuance criteria. This APP includes measures to ensure that potential adverse effects to golden eagles from repowered turbines in the Project Area are compatible with the goal of “stable or increasing breeding populations” as set forth in the *Draft Bald and Golden Eagle Protection Act Standards for Review of Wind Energy Projects* (U.S. Fish and Wildlife Service 2010) and the Draft ECP Guidance (see Chapters 4-6). Specifically, requirements in the APP for preconstruction surveys, risk assessments, fatality estimation, turbine siting, and other conservation measures at the project level generally adhere to the approach of the Draft ECP guidance, which is currently in draft form, to assess risk and minimize impacts to eagles. The emphasis of the Draft ECP Guidance is directed toward establishment of new projects and addressing the importance of siting such projects to minimize disturbance of primary golden eagle use areas. Because the APWRA has already been developed for wind energy, micrositing of repowered turbines will be used to minimize interactions with eagles (see *5.0 Conservation Measures* for discussion).

1.3.2.3 California Energy Commission Guidelines

Published by the CEC and the CDFW, the *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development* (CEC Guidelines) (California Energy Commission and California Department of Fish and Game 2007) outline the generally accepted procedures for the permitting and study of wind-energy developments in the state. The CEC Guidelines are intended to provide a strategy to reduce impacts on birds and bats from new wind energy-developments or repowering of existing wind-energy projects in California. The CEC Guidelines include recommendations for screening proposed sites; study design; impact assessment; and development of avoidance, minimization, and mitigation measures. Although following the CEC Guidelines is voluntary, they represent predominantly the current state of knowledge on wind-wildlife interactions and generally are accepted by industry and agencies as among the best available resources and frameworks for assessing potential impacts on birds and bats from wind-energy projects in California. Many of the feasible practices to minimize impacts to birds that have been adopted by the wind-energy industry are described in the CEC Guidelines and are incorporated in this APP.

The CEC Guidelines describe four project categories used to determine recommended levels of pre-project study:

- Category 1—Project Sites with Available Wind-Wildlife Data.
- Category 2—Project Sites with Little Existing Information and No Indicators Of High Wildlife Impacts.
- Category 3—Project Sites with High or Uncertain Potential for Wildlife Impacts.
- Category 4—Project Sites Inappropriate for Wind Development.

The CEC Guidelines note that a reduced study effort may be appropriate for Category 1 projects, although they warrant caution in extrapolating existing data to unstudied nearby sites. Factors to consider in determining whether or not data from an adjacent facility would allow a project to be classified as Category 1 include (California Energy Commission and California Department of Fish and Game 2007):

1. Whether the field data were collected using a credible sample design
2. Where the data were collected in relation to the proposed site
3. Whether the existing data reflect comparable turbine type, layout, habitat
4. Suitability for migratory species, physical features, and winds
5. Whether the data are scientifically defensible and still relevant

The Project Area likely falls into Category 1 because there have been extensive fatality monitoring efforts coupled with the collection of bird use and behavior data for both old generation and repowered projects. However, the CEC Guidelines recommend consultation with the lead agency, USFWS, CDFW, biologists with specific expertise, and other appropriate stakeholders (such as a conservation organization representative) when considering whether a project qualifies as Category 1.

1.3.3 County Policy

The *East County Area Plan* (County of Alameda Community Development Agency 2000) contains the following policies and programs pertaining to minimizing adverse impacts to wildlife from wind-energy development:

> **Policy 169:** The County shall allow for continued operation, new development, redevelopment, and expansion of existing and planned wind farm facilities within the limits of environmental constraints.
>
> **Policy 171:** The County shall work with the wind-energy industry, public utilities, other agencies, and energy experts to monitor trends in wind-energy developments, technology, and environmental safeguards.
>
> **Policy 172:** The County shall establish a mitigation program to minimize the impacts of wind turbine operations on bird populations.
>
> **Program 73:** The County shall work with other agencies (federal, state, and local) to establish feasible mitigation for avian collisions with wind turbines. The County will take a lead role with windfarm operators and other agencies in developing and managing a Mitigation Monitoring Program in the Wind Resource Area.

Program 74: The County shall amend the Zoning Ordinance to incorporate siting and design standards for wind turbines to mitigate biological, visual, noise, and other impacts generated by windfarm operations.

Program 75: The County shall revise, as necessary, the conditions of existing conditional use permits for wind turbine operations at the time a permit is due for its five year review to mitigate the effects of wind turbines.

1.3.4 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 of 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 Companies to achieve a 50 percent reduction in avian fatalities from estimated annual fatalities of four focal raptor species (golden eagle, burrowing owl, American kestrel, and red-tailed hawk). Companies who 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 for habitat of raptors and other wildlife. It is the intention of this APP to meet the requirements of the 2007 Settlement Agreement to develop an agreement that addresses the "long-term operation of wind turbines within the APWRA" and to reduce fatalities for the above-mentioned raptor species.

1.4 Bird Abundance and Fatality Studies

Researchers have investigated bird abundance and turbine-related fatalities in the APWRA for over two decades. These various studies include (1) initial studies of bird abundance and turbine-related fatalities, (2) ongoing bird activity and fatality monitoring conducted by the Alameda County Avian Fatality Monitoring Team (ACAFMT; see *1.4.2 Monitoring Program*); and (3) studies investigating bird abundance and turbine-related fatality, including research investigating the potential effect of repowering on birds in the APWRA.

Avian-use surveys conducted by the ACAFMT and other studies as noted below informed Section 2.2, *Avian Use*. Fatality data from the current monitoring program (ICF International 2012b), as well as targeted studies assessing the potential effect of repowering the APWRA on avian fatalities, were used to inform the Impact Assessment (see *3.0 Impact Assessment*).

1.4.1 Initial Studies

Initial bird use and fatality studies in the APWRA began in the late 1980s. Alameda and Contra Costa counties and the California Energy Commission funded bird abundance and mortality research after studies indicated that turbine-related fatalities in the APWRA may have caused population-level impacts to raptor species (Orloff and Flannery 1992, Howell and DiDonato 1991). These studies included raptor observation and fatality surveys around turbines. Orloff and Flannery (1992) estimated 403 wind-farm related deaths to raptors during the first year of surveys and 164 during the second year, with an estimated 39 golden eagles killed each year, finding that American kestrels, red-tailed hawks, and golden eagles were killed more often than would be predicted by their abundance. Continuing their initial study, Orloff and Flannery (1996) further analyzed fatality and observation data collected during the original study and collected and analyzed new data. Among other findings, the analysis indicated that turbine position in row and proximity to canyons was significantly associated with turbine-related fatalities; however, the study was not able to clearly define the causality of varying fatality rates at different turbine types.

Bird abundance and mortality research continued into the 2000s, forming the baseline fatality levels for raptors against which post-repowering fatality reduction in the APWRA is measured, according to the 2007 Settlement Agreement. Funded by the National Renewable Energy Laboratory, these studies estimated APWRA-wide fatalities and investigated other causal factors such as bird behavior, raptor prey availability, and turbine design and distribution, among other landscape attributes (Thelander et al. 2003, Smallwood and Thelander 2004, Smallwood and Thelander 2005). Based on fatality sampling from 1998 to 2003, these efforts concluded that turbines in the APWRA were killing over one thousand raptors each year and thousands of all bird species combined (Smallwood and Thelander 2008).

1.4.2 Monitoring Program

Following the initial studies of avian fatality in the APWRA, a comprehensive, APWRA-wide avian-fatality monitoring program was established and has been operating continuously since 2005. The ACAFMT monitored approximately 2,500 (55%) of the approximately 4,500 turbines currently operating in the APWRA from 2005 through 2009 bird years[6] (ICF International 2012a). The number of turbines monitored was reduced in 2010 to approximately 1,200 turbines. The primary objective of this program is to assess progress toward reducing raptor fatalities by 50% (see Section 1.3.4). The ACAFMT provides annual fatality reports documenting estimated turbine-related fatalities in the APWRA (ICF International 2012a), and uses the available data to assess the effectiveness of management actions such as the seasonal shutdown and removal of hazardous turbines in reducing avian fatalities. Reports have also addressed the potential of repowering for reducing turbine-related avian fatalities. Attempts to assess reductions in avian fatalities from the baseline derived from Smallwood and Thelander (2004) and codified by the 2007 Settlement Agreement failed, primarily because differences in sampling methodology search interval made a valid comparison of the two studies impossible with the data available at the time.

Since October 2005, the ACAFMT has conducted avian-use surveys, which were first implemented at the 31 Diablo Winds repowered turbines from eight observation points, then expanded to the entire APWRA adding seventy additional observation points. The number of observation points has changed over time, and there are presently 77 being monitored. Currently, two 10-minute point surveys are conducted each month at each observation point, recording bird species observed within 600 meters (1,968 feet).

1.4.3 Causality and Repowering Studies

Since the early 1990s, many researchers have investigated bird activity and mortality in the APWRA in an attempt to establish causal relationships and to determine ways to reduce the number of turbine-related fatalities (Orloff and Flannery 1996, Orloff and Flannery 1992). These studies

[6] To better reflect the timing of annual movements of birds through the APWRA, the Monitoring Program bases its analyses on a *bird year*, defined as October 1 through September 30, rather than a calendar year.

include surveys to estimate raptor abundance (Barclay and Harman 2008 unpublished data, Smallwood et al. 2007, Camp 2006 unpublished data, Hunt et al. 1999, Hunt and Hunt 2006), bird use and fatality surveys at repowering projects in the APWRA (Western Ecosystems Technology, Inc. 2008, Insignia Environmental 2012), studies analyzing bird use and behavior to minimize the impacts of repowered turbines (Smallwood and Neher 2011, Smallwood and Neher 2010, Smallwood et al. 2009, Smallwood et al. 2008), and studies estimating the potential reduction in turbine-related fatalities from repowering (Smallwood 2010, Smallwood and Karas 2009, Smallwood and Neher 2004).

2.0 Existing Conditions

2.1 Project Area and Vicinity

2.1.1 Characteristics and Land Use

The Project Area for the APP is located in the Alameda County portion of the APWRA, east of the San Leandro Hills and Walpert Ridge. The Altamont Hills range in elevation from 250 feet in valley bottoms to 1,700 feet at the hilltops. Situated in the Diablo Range west of California's Central Valley, the mostly treeless terrain is characterized by steep slopes in the west changing to gently rolling hills in the east as the Altamont Hills transition to the floor of the Central Valley. Differential air temperatures between the warmer Central Valley east of Altamont Pass and the cooler marine air from the San Francisco Bay cause steady winds of 15 to 30 miles per hour to blow across the Project Area during the mid-afternoon and evening periods between April and September (County of Alameda Community Development Department 1998). This seasonal high wind period is when 70 to 80% of the wind turbine power is generated at the APWRA. Winter wind speeds are lower, averaging 9 to 15 miles per hour.

The prevailing winds, topographic features, and open space that make the APWRA an excellent location for wind-energy production and the area supports extensive wind-energy development. The Project Area is designated as Large Parcel Agriculture under the County Zoning Ordinance and the *East County Area Plan*. Single-family residences, general agriculture, grazing, and riding or hiking trails are all allowed uses. Conditional uses permitted under the CUP include outdoor recreation facilities, transmission facilities, solid waste landfills, and wind-energy facilities (County of Alameda Community Development Agency 2000). The Wind Resource Area (WRA) designation, created within Large Parcel Agriculture in east Alameda County, pertains to existing wind-energy facilities and the County's intention to allow continued development and utilization of wind resources into the future. The WRA designation facilitates real estate disclosures about existing wind-energy facilities and the potential for future wind facilities. In addition to wind energy, the primary land use in this area is grazing.

The same prevailing winds, topographic features, and open space that make the APWRA an excellent location for wind-energy production also support a broad diversity of resident and migratory bird species that regularly move through the wind turbine area (Orloff and Flannery 1996). Diurnal raptors (eagles and hawks), in particular, use the prevailing winds and updrafts for soaring and gliding during daily movement, foraging, and migration. *2.2 Avian Use* provides an overview of bird species that are present in the APWRA with additional descriptions of the focal species. Appendix A lists all bird species observed within the APWRA.

2.1.2 Wind Turbines

There are several thousand wind turbines currently installed in the APWRA (Figure 1). The terms *first-generation*, *second-generation*, and *current-generation* are used to group wind-turbine types with similar technologies currently installed or to be installed in the Project Area. Within the Project Area, first-generation and second-generation wind turbines were designed and installed during the

1980s and 1990s, respectively. The tower height of first- and second-generation turbines ranges from 18 meters to 55 meters. These turbines have an approximate 20-year operating life (the length of time that an individual wind turbine is designed to remain in operation) with 40- to 500-kilowatt (kW) rated capacities and 20 percent to 25 percent capacity factors[7]. Most of the turbines now operating in the APWRA were installed in the 1980s and are first- and second- generation, utility-grade commercial wind turbines, now considered old technology. Current-generation wind turbines are wind turbines designed and installed (or that will be installed) in the 21st century. The tower height of current-generation turbines ranges from 50 meters to 105 meters. Current-generation wind turbines anticipated to be installed by the project proponents have an approximate 25- to 30-year operating life, 1 to 3 MW rated capacity, and a 30 to 35 percent average capacity factor.

Three wind-energy facilities in the APWRA support current-generation turbines: Diablo Winds repowering project (located in the Project Area and operational as of 2004), Buena Vista repowering project (located in Contra Costa County and operational as of 2006), and Vasco Winds repowering project (located in Contra Costa County and operational as of January 2012). Although the 31 Diablo Winds turbines in the APWRA are considered current generation, they are only 50 meters tall with a rated capacity of 660 kW. The Buena Vista repowering project installed 38 turbines, each with a 1 MW capacity rating. The majority of these towers are 55 meters in height, 7 turbines are 45 meters tall, and 2 of the turbines are up to 65 meters tall. The Vasco Winds repowering project installed 34 2.3-MWturbines that are 80 meters tall. The Tres Vaqueros repowering project, located in Contra Costa County and in the planning stages, anticipates installing 2.3-MW rated capacity, 80-meter tower height turbines (Contra Costa County Department of Conservation and Development 2011). As described in the County of Alameda Repowering Program Programmatic Environmental Impact Report (PEIR), three repowering projects—Summit Wind (Altamont Winds Inc. [AWI]) Patterson Pass (enXco) and Golden Hills (NextEra)—are proposed in the Project Area.

Most first- and second-generation wind turbines in the Project Area are operational between February 15 and October 31 because they are restricted by seasonal shutdown requirements resulting from the 2007 Settlement Agreement. The period of shutdown coincides with a period of heavy use by wintering birds, as well as the low-wind periods of the year. The purpose of seasonal shutdown is to reduce the level of avian fatalities. Repowered turbines in the Project Area are exempt from the seasonal shutdown requirements. Variables influencing operation of turbines include wind conditions, maintenance needs, and operational requirements described in the CUPs issued by the County and the land use permits (LUPs) issued by the County of Contra Costa. Seasonal shutdowns have varied from year to year but are currently required annually in Alameda County between November 1 and February 15 of the following year.

2.2 Avian Use

The APWRA supports a broad diversity of resident, migratory, and wintering bird species that regularly move through the wind turbine area (Orloff and Flannery 1996). In particular, diurnal raptors (eagles and hawks) use the prevailing winds and updrafts for soaring and gliding during daily movement, foraging, and migration.

[7] Capacity factor is the ratio of the actual power output of a turbine over a period of time and its potential power output if it had operated at full nameplate capacity the entire time.

Bird use surveys conducted by Western EcoSystems Technology (2008) at the Diablo Winds repowering project, in the north-central portion of the Project Area, from April 2005 to February 2007 documented 27 bird species, including six special-status species: American white pelican (California SSP) golden eagle (fully protected species), northern harrier (SSP), loggerhead shrike (SSP), white-tailed kite (fully protected species), and yellow-billed magpie (USFWS Bird of Conservation Concern).

Insignia Environmental (2012) conducted bird use surveys for the Buena Vista repowering project from February 2008 to January 2011. The six observation points were within the Buena Vista site north and adjacent to the Project Area in Contra Costa County. The six most common species in the area were observed to be red-tailed hawk, common raven (*Corvus corax*), golden eagle, turkey vulture (*Cathartes aura*), American crow (*Corvus brachyrhynchos*), and American kestrel. Raptors, including red-tailed hawk, golden eagle, American kestrel, ferruginous hawk (*Buteo regalis*), burrowing owl, northern harrier (*Circus cyaneus*), and Swainson's hawk (*Buteo swainsoni*; state-listed as threatened), constituted approximately 62 percent of all records. All species identified during these surveys are documented in Appendix A. Additionally, the ACAFMT has documented bird use for the American kestrel, burrowing owl, golden eagle, and red-tailed hawk throughout the APWRA since 2005. Background information regarding the biology of the eight focal species of the APP and their documented presence in the APWRA is provided in the proceeding sections.

2.2.1 Focal Species

2.2.1.1 American Kestrel in the APWRA

Overview of American Kestrel Biology

American kestrels are found in a variety of open to semi-open habitats, including meadows, grasslands, deserts, early field successional communities, open parkland, agricultural fields, and both urban and suburban areas (Smallwood and Bird 2002). Grinnell and Wythe (1927) described the American kestrel as a common resident throughout the San Francisco Bay region. Local nesting records exist in western Alameda County (DiDonato 1987 unpublished data; Seibert 1942) and southern Solano County (Stoner 1937), but no nests have been documented within the Project Area. This species is observed in fields, meadows, and on open hillsides, perched on trees, rocks, fence posts, utility poles and wires, or hovering in mid-air (Polite and Ahlborn 1990).

American kestrels forage on a wide variety of insects, including grasshoppers, cicadas, beetles, dragonflies, butterflies, and moths; small rodents, especially voles and mice; and small birds (Sherrod 1978). Individual diets probably reflect prey availability with respect to season and locale. American kestrels are perch and pounce or hover and pounce predators, rarely pursuing prey on wing (Polite and Ahlborn 1990, Sibley 2000); they tend to perch lower as wind speed increases (Smallwood 1990 as cited in Smallwood and Bird 2002).

The American kestrel is a cavity nester, using tress, snags, rock crevices, cliffs, banks, and buildings (Polite and Ahlborn 1990). Nesting densities vary greatly: typically from 0.11 to 1.74 pairs per square kilometer (km^2) (0.28 to 4.5 pairs per square mile [mi^2]) but as high as 5.4 and 24.7 pairs/km^2 (14.0 and 63.0 pairs/mi^2) (Bird and Palmer 1988). Kestrels often compete with other cavity nesters such as woodpeckers, starlings, owls, bluebirds, nuthatches, chipmunks, and squirrels (Polite and Ahlborn 1990). American kestrels display strong site fidelity to breeding territories and wintering areas; however, little information exists regarding the actual delineation of territory size

(Smallwood and Bird 2002). The breeding season in California occurs between late February and August, with egg laying occurring from mid-March to late June (Smallwood and Bird 2002; B. Power pers. comm.). Reproductive success varies with age, prior breeding experience, prey availability, and weather (Smallwood and Bird 2002). Average age at first breeding is 1 year. Information on lifetime reproductive output in the wild remains undetermined.

Presence in the APWRA

While the California Natural Diversity Database (CNDDB) does not contain records for American kestrel as they are not a federal or state-listed species, previous studies in the region have found the area around the APWRA to be an important winter foraging area and migration corridor for raptors, including American kestrels (California Department of Fish and Game 1993). Natural perches from which this species hunts were scarce before development of the APWRA. Turbines and transmission towers, poles, and lines provide abundant perches and have likely resulted in a substantial increase in American kestrel numbers in the APWRA over historic numbers (Orloff and Flannery 1992). The first year of post-construction monitoring for the Diablo Winds repowering project recorded 18 observations of American kestrels (Western EcoSystems Technology, Inc. 2008). Forty-four observations were recorded in post-construction bird use surveys at the Buena Vista repowering project from February 2008 to January 2011 (Insignia Environmental 2012). Kestrels have been observed throughout the APWRA during surveys conducted by the ACAFMT (ICF International 2012b) with monthly mean usage rates ranging between < 0.01 observations per minute per kilometer^3 (obs/min/km^3) in May to approximately 0.09 obs/min/km^3 in January during the 2010 bird year (ICF International 2012a).

2.2.1.2 Barn Owl in the APWRA

Overview of Barn Owl Biology

The barn owl is found throughout most of the United States, except in the northern portions of the Rockies, Midwest, and Northeast (Marti et al. 2005). Within California, this species is a year-round resident ranging from sea level to 5,500 feet, preferring habitat in grasslands, agricultural fields, chaparral, marshes, and other wetland areas. Barn owls nest in a wide variety of cavities, natural and artificial, such as trees, cliffs, caves, riverbanks, church steeples, barn lofts, haystacks, and nest boxes. Its breeding numbers seem limited by the availability of nest cavities in proximity to adequate densities of prey. Most hunting occurs while flying about 5 to 15 feet above the ground in open habitats, using excellent low-light vision and sound to detect prey (Bunn et al. 1982; Marti 1974). The species occasionally hunts from perches and feeds primarily on mice, rats, voles, pocket gophers, and ground squirrels. It also consumes shrews, insects, crustaceans, reptiles, amphibians, and birds, including meadowlarks and blackbirds (Polite 1990).

The barn owl breeding season in California occurs between January and November, with egg laying potentially occurring during most months as barn owls typically have two broods a year (Marti et al. 2005; Polite 1990). Reproductive success varies with age, prior breeding experience, prey availability, and weather (Marti et al. 2005). Average age at first breeding is 1 year. In northern Utah, Marti (1997) found lifetime reproductive success for breeding females was 1 to 66 eggs (mean = 10.2 ± 7.87) and from 0 to 50 fledglings (mean = 5.98 ± 6.28), while breeding males tended 1 to 35 eggs (mean = 8.7 ± 5.46) and from 0 to 17 fledglings (mean = 4.72 ± 3.87). Barn owls defend only the immediate vicinity of the nest, allowing two or more pairs to nest in close proximity and share the same foraging habitat.

There is no significant continent-wide barn owl population trend. Population declines have been evident in the Midwest and Northeast U.S., while Western U.S. populations appear to be mostly stable. Local threats or declines do not pose a major conservation problem from a global perspective (NatureServe 2012).

Presence in the APWRA

The CNDDB does not contain records for barn owls as they are not a federally or state-listed species. Studies of wind-turbine-related fatalities in the APWRA have found numerous barn owls, suggesting this species is fairly common in portions of the planning area. Barn owls are particularly common in the areas of Brushy Peak and Vasco Caves Regional Preserves, using available rock outcrops, palm trees, and structures for nesting and roosting (EBRPD 2000, EBRPD 2002). Additionally, barn owls have been observed nesting in small numbers in structures including turbines in the APWRA (L. Nason pers. comm.).

2.2.1.3 Burrowing Owl in the APWRA

Overview of Burrowing Owl Biology

In California, the range of the burrowing owl extends through the lowlands south and west from north central California to Mexico, with a small (perhaps extirpated) population in the Great Basin bioregion in northeast California (Cull and Hall 2007) and the desert regions of southeast California (Gervais et al. 2008). Burrowing owl populations have been extirpated from much the San Francisco Bay Area (Trulio 1997; DeSante et al. 2007), although they persist in San Jose, the Tri-Valley area of Alameda County, and the Altamont Hills (Barclay and Harman 2008 unpublished data). Burrowing owl numbers are greatly reduced along most of the California coast from San Francisco to Los Angeles. The remaining major population densities of burrowing owls in California are in the Central and Imperial Valleys (DeSante et al. 2007).

California supports year-round resident burrowing owls and over-wintering migrants (Gervais et al. 2008). Dispersal and migration in burrowing owls that nest in California is variable depending on location and the age of the owls. Many owls remain resident throughout the year in their breeding locales (especially in central and southern California) while some apparently migrate or disperse in the fall (Haug et al. 1993; Coulombe 1971; Harman and Barclay 2007). Owls breeding north of California, in northern California, and at higher altitudes (e.g., Modoc Plateau) are believed to move south during the winter with some birds overwintering in California (Grinnell and Miller 1944; Coulombe 1971; Zeiner et al. 1990; Harman and Barclay 2007).

Burrowing owls typically forage in habitats characterized by low-growing, sparse vegetation and opportunistically consume arthropods, small mammals, birds, amphibians, and reptiles (Haug et al. 1993; Gervais et al. 2008). Insects are often taken during the day, while small mammals are taken at night. In California, crickets and meadow voles were found to be the most common food items (Thomsen 1971). Owls have been detected foraging out to 1 mile from their burrows. Inter-nest distances, which may indicate the limit of an owl's breeding territory, have been found to average between 61 and 214 meters (200 and 702 feet) (Thomsen 1971; Haug and Oliphant 1990).

In California, burrowing owls typically begin pair formation and courtship in February or early March. Burrowing owls are primarily monogamous and typically breed once per year. Both sexes reach sexual maturity at 1 year of age. Clutch sizes range from one to 14 eggs proportional to prey abundance. Eggs hatch asynchronously, which is an adaptation to annual variation in prey abundance allowing for more young to be raised during years when prey is plentiful (Newton 1977, 1979; Wellicome 2005). The young fledge at 44 days but remain near the burrow and join the adults in foraging flights at dusk (Thomsen 1971; Haug et al. 1993; Rosenberg et al. 1998). Productivity in four different regions of California ranged from 1.6 to 2.8 young per nesting attempt and 2.9 to 4.0 young per successful nesting attempt (Klute et al. 2003). Annual nesting success can range from 33% (Thomsen 1971) to 100% (Martin 1973).

Presence in the APWRA

The CNDDB (2012) contains 129 occurrences of burrowing owls in the 10 miles of the Project Area, 31 of which are in the Project Area, with many of these records attributed to sightings of several breeding individuals over multiple years and sightings of birds during the non-breeding season (Map 2). A large number of the CNDDB records occur in the area encompassed by Vasco Road, Diablo Camino, Byron Highway, and Interstate 580. Smaller concentrations of owls have been detected near Mountain House Golf Course on Altamont Pass Road and Lawrence Livermore National Laboratory Site 300 lands along the Alameda and San Joaquin County lines. Using a predictive model, Smallwood et al. (2007) estimated the breeding population of burrowing owls in the APWRA to be between 35 and 75 pairs. At the end of the breeding season, the population was estimated to be between 208 and 446 owls. Focused surveys in 2006–2007 through the central portion of the APWRA found 31 pairs and 46 pairs respectively, suggesting the original breeding population estimate in the APWRA was underestimated (Barclay and Harman 2008 unpublished data). Smallwood et al. (2012) surveyed the APWRA for breeding burrowing owls in 2011 and 2012 across 46 sampling plots from 40 to 100 hectares (99 to 247 acres) in size. They estimated 537 to 635 breeding pairs in 2011 and 576 to 607 pairs in 2012, confirming that prior studies may have underestimated the breeding population. It is believed that the APWRA may contain the largest number of breeding pairs in the San Francisco Bay Area (Barclay and Harman 2008 unpublished data). During the 2010 bird year, monthly mean burrowing owl usage rates across the APWRA ranged between < 0.05 obs/min/km^3 in December to approximately 0.25 obs/min/km^3 in November (ICF International 2012a).

2.2.1.4 Golden Eagle in the APWRA

Overview of Golden Eagle Biology

The golden eagle is a large raptor with resident populations in California. While it can be found in a broad range of habitats where sufficient, accessible prey and satisfactory nest sites are present, golden eagles generally avoid forested, urban, and cultivated agricultural areas, preferring open landscapes of native vegetation. The highest density of golden eagles in the world is found in the Altamont Hills within the County, where the updrafts are favorable and mature oaks interspersed with grassland provide both ideal nest sites and abundant California ground squirrels for prey (Peeters and Peeters 2005).

Golden eagles are most likely to occur where there are dense populations of ground squirrels or rabbits. In addition to their favored prey species, a wide variety of food items are taken: birds, reptiles, carrion, foxes, bobcats, and ungulates (e.g., deer). They may hunt by diving from a high soar, but often fly low, following the contours of the land to surprise their prey.

Golden eagles prefer to locate their nests on cliffs or trees near forest edges or in small stands near open fields (Bruce et al. 1982; Hunt et al. 1995, 1999). Placement of nests in trees just below a ridgeline or hilltop allows nesting eagles to drop down to the nest with heavier prey (Peeters and

Peeters 2005). Golden eagles usually have more than one nest site in a given territory. It is not uncommon for a nest to go unused for a period of years before being refurbished and occupied again, although golden eagles, in general, tend toward high site fidelity for both nesting and wintering areas (Kochert et al. 2002).

Mating occurs from late January through August; eggs are laid from early February to mid-May. Clutch size varies from one to four eggs, but two is the most common number (Johnsgard 1990; Hunt et al. 1995). Incubation lasts 43 to 45 days (Kochert et al. 2002), and the fledging period is about 72 to 84 days (Johnsgard 1990); juveniles may remain in the vicinity of their natal site until evicted by the parents (Brown 1969). During the breeding season, the average foraging home range is roughly 20 to 33 km^2 (8.5 to 12.7 mi^2). In the non-breeding season, resident pairs continue to inhabit and defend their nesting territory, though they may shift their utilization and range size during winter. Floaters (nonbreeding adult eagles without breeding territories) commonly move about regionally until they find a suitable vacant territory or are able to evict a territorial owner (Hunt et al. 1995, 1999). Some migrants may temporarily move into areas used by resident birds during the winter. During the 2010 bird year, monthly mean golden eagle usage rates across the APWRA ranged between approximately 0.10 obs/min/km^3 in July to approximately 0.37 obs/min/km^3 in January (ICF International 2012a).

Presence in the APWRA

The Predatory Bird Research Group estimated that at least 70 active golden eagle territories existed within 20 miles of the APWRA boundary, based on annual surveys from January 1994 to December 1997 (Hunt et al. 1999). These territories were resurveyed and occupancy verified in 2005 (Hunt and Hunt 2006). The CNDDB (2012) includes 18 occurrences of golden eagles within 10 miles of the Project Area; no nests are documented within the Project Area (Map 2). The majority of these records are located to the northwest of the Project Area around Los Vaqueros Reservoir. Nine of the occurrence records documented nesting pairs of golden eagles during at least one breeding season between 2005 and 2008 (CNDDB 2012). Post-construction monitoring at Diablo Winds repowering project over a 2 year period documented 122 golden eagle sightings in the Project Area.

2.2.1.5 Loggerhead Shrike in the APWRA

Overview of Loggerhead Shrike Biology

Loggerhead shrikes once occurred in suitable lowland habitats throughout most of the Bay Area (Grinnell and Wythe 1927). Loggerhead shrikes inhabit open country with a moderate amount of grass cover and areas of bare ground, including shrublands, pastures with fence rows, mowed roadsides, cemeteries, golf courses, agricultural fields, riparian areas, and open woodlands (Yosef 1996; Humple 2008). Preferred territory sites include tall shrubs, trees, fences, or power lines for perching; open areas composed of short grasses, forbs, or bare ground for hunting; plants with thorns or multiple stems and barbed-wire fences for impaling prey; and large shrubs or trees for nesting.

Loggerhead shrike is a sit-and-wait predator using high perches and hovering and diving at prey below. It also hovers while foraging (Yosef 1996). It favors fence lines and utility lines and poles for perching, so it is frequently found along roadways (Yosef 1996). The diet of shrikes varies seasonally, and consists of arthropods, including grasshoppers, crickets, beetles, and caterpillars, reptiles, amphibians, small rodents, and birds (Craig 1978; Yosef 1996). They are perch hunters and take prey primarily from the ground, but occasionally in flight. Banding studies suggest that in the northern portion of their breeding range, loggerhead shrikes move south from areas that have 10 to 30 days of snow cover, with most wintering south of latitude 40°N (Yosef 1996). In California, shrikes are entirely resident south of 39°N (Grinnell and Miller 1944). However, little information exists on the migration routes, timing of migration, and wintering areas, especially for the California population. Loggerhead shrikes in California typically begin pair formation and courtship in February or early March, although resident birds remain paired year-round (Yosef 1996). There is little information on lifetime reproductive success, life span, or juvenile or adult survivorship (Yosef 1996).

Presence in the APWRA

The CNDDB (2012) contains eight occurrences of loggerhead shrikes within 10 miles of the Project Area, three of which are within the Project Area (Map 2). Previous research in the APWRA indicates that this species is widely distributed in the region. Between March 1998 and September 2001, 139 sightings of loggerhead shrikes were documented during behavioral observations across the APWRA (Smallwood and Thelander 2005). Additionally, the species has been observed in many locations across the APWRA, including nests in or on turbine structures (L. Nason pers. comm.) and a nest on a water tower west of Del Valley Reservoir during surveys conducted by the ACAFMT (ICF International 2012b).

2.2.1.6 Prairie Falcon in the APWRA

Overview of Prairie Falcon Biology

The prairie falcon inhabits arid environments of western North America in open plains and shrub-steppe deserts with cliffs, bluffs, or rock outcroppings. An efficient and specialized predator of medium-sized desert mammals and birds, the Prairie Falcon ranges widely, searching large areas for patchily distributed prey. Nesting, postnesting, and wintering ranges are generally widely separated, with movements between ranges being potentially dependent on seasonal availability of prey. A diurnal hunter, the prairie falcon's prey consists predominantly of ground squirrels, small birds, reptiles, and insects. Hunting strategies include still-hunting from a perch, soaring, and low active flight (Phipps 1979). Prairie falcons nest on cliffs with eagles, ravens, and red-tailed hawks, but have also been known to use trees, caves, buildings, and transmission lines (MacLaren et al. 1984, Roppe et al. 1989, Bunnell et al. 1997, Nelson 1974, Pitcher 1977, Haak and Denton 1979). Prairie falcons are monogamous (Platt 1981); however, information regarding mate fidelity is not available. Territory sizes based on records from California (Kaiser 1986) are a 300-400 meter- (984-1312 foot-) horizontal radius from the nest location as well as 100 meters (328 feet) vertically (Ogden and Hornocker 1977, Harmata et al. 1978). Winter territories are not defended (Beauvais et al. 1992), while breeding season territories are patrolled daily (Ogden and Hornocker 1977). Depending on the availability and continuity of cliffs and species density, distances between nests can range from an average of 664 meters (2,178 feet) in southwest Idaho (USGS/BRD Unpub.) to 10.5 km (6.5 miles) in west central Arizona (Millsap 1981). Egg laying begins as early as March with hatching dates ranging from the beginning of April to the end of June in southwest Idaho (USGS/BRD Unpub.). There is typically one brood per year and clutch sizes have been observed to range from 2-6 eggs per nest (Steenhoff 1998).

Presence in the APWRA

Thirteen observations of prairie falcons were recorded during monitoring at two sites within the APWRA, including one nest observed with both male and female adults and one young present (Howell and DiDonato 1991). The CNDDB (2012) documents two prairie falcon occurrences within the Project Area, and 11 more within 10 miles of the Project Area boundary. Twenty-six observations of prairie falcons were recorded during fixed point surveys around the Diablo Winds repowering project from 2005 to 2007 (Western Ecosystems Technology 2008). Historically, rock outcrops in the north of Vasco Road north of the Project Area have supported nesting prairie falcons (L. Nason, pers. comm.).

2.2.1.7 Red-tailed Hawk in the APWRA

Overview of Red-tailed Hawk Biology

Red-tailed hawks occur in California throughout the year. Large numbers of migratory and wintering red-tailed hawks enter the Central Valley from October through February, augmenting the population occurring within the state significantly. Migratory, wintering, and resident red-tailed hawks inhabit California in open areas, such as grasslands, agricultural fields, pastures, and open brush habitats, interspersed with patches of trees or structurally similar features for nesting, perching, and roosting (Polite and Pratt 1990). This species is primarily a sit-and-wait predator that requires elevated perch sites for hunting; however, red-tailed hawks can also be seen soaring over open landscapes and swooping for prey. Their diet includes a wide variety of small to medium-sized mammals, birds, and snakes, with occasional insects and fresh carrion (Preston and Beane 1993). Nest locations vary with vegetation and topography.[8] In the western United States, satellite tracking indicates that adult red-tailed hawks show high fidelity to their summer and winter ranges and to migration routes (Goodrich and Smith 2008).

Pair formation and courtship begins in late winter or early spring (Preston and Beane 1993). Some resident red-tailed hawks remain together and defend territories throughout the year. In California, territories vary from 0.1 to 0.3 square mile with a density of 2.1 breeding pairs per square mile (Fitch et al. 1946). Egg-laying begins between February and June, with the peak laying period occurring between March and May. Clutch sizes in California average 2.92 eggs per nest with a range of two to five eggs. Reproductive success varies with prey abundance, perch density and distribution, and proximity of nests to cogeners (Preston and Beane 1993). Average age at first breeding is not known, but few juveniles (<2 years; possessing a brown tail) of either sex have been observed breeding (Wiley 1975). Lifetime reproductive output remains undetermined.

Presence in the APWRA

While the CNDDB does not contain records for red-tailed hawks as they are not a federal or state-listed species, previous studies found the APWRA and the surrounding region to be an important winter foraging area and migration corridor for raptors, including red-tailed hawks (California Department of Fish and Game 1993). Natural perches from which this species hunts were scarce before development of the APWRA. Turbines and transmission towers, poles, and lines provide abundant perches and may have resulted in a substantial increase in wintering red-tailed hawks in the Project Area over historic numbers (Orloff and Flannery 1992). Despite only a small number of

---

[8] Observations of nesting red-tailed hawks in the APWRA in 2005 to 2006 were confirmed in the field by Jones & Stokes wildlife biologist Julia Camp.

suitable sites in the APWRA, pairs of red-tailed hawks have been observed nesting in trees or transmission towers (L. Nason pers. comm.).

The first year of post-construction monitoring for the Diablo Winds repowering project recorded 291 observations of red-tailed hawks (Western EcoSystems Technology, Inc. 2008). Red-tailed hawks were the most commonly observed species at the Buena Vista repowering project from February 2008 to January 2011, constituting 26 percent of the observation records (Insignia Environmental 2012). During the 2010 bird year, monthly mean red-tailed hawk usage rates across the APWRA ranged between approximately 0.50 obs/min/km^3 in July to approximately 3.00 obs/min/km^3 in January (ICF International 2012a).

2.2.1.8 Swainson's Hawk in the APWRA

Overview of Swainson's Hawk Biology

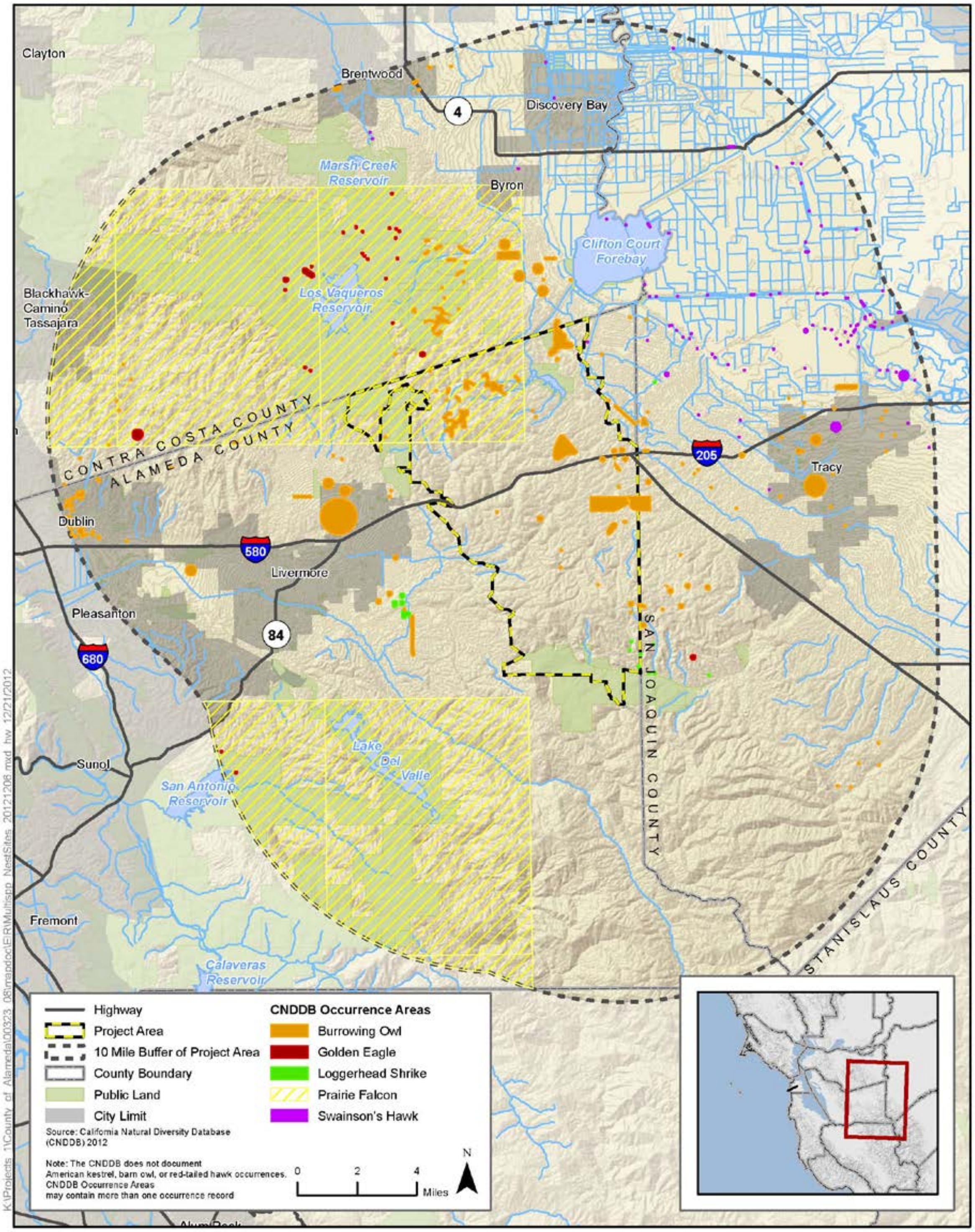
The Swainson's hawk is a diurnal, migratory, highly mobile raptor. Individuals have large home ranges. Swainson's hawks breed in desert, shrub-steppe, grassland, and agricultural habitats in areas throughout most of the western U.S. and Canada, and northern Mexico (England et al. 1995). Historically, breeding populations probably occurred throughout the state of California, except in bioregions characterized by mountainous forested terrain (Bloom 1980). Breeding populations in California currently occur predominantly in two locations, the Great Basin and the Central Valley. Nearly 94% of nesting Swainson's hawks in California are found in the Central Valley (an estimated 1,948 nesting pairs) (Anderson et al. 2007) from Tehama County south to Kern County. This species nests in riparian forest or in remnant riparian trees and forages primarily in agricultural lands (such as fallow fields and alfalfa fields; Estep 1989; Babcock 1995) and natural grasslands. Historically, Swainson's hawk probably foraged in upland and seasonally flooded perennial grasslands (Woodbridge 1998), soaring over open habitats. Central Valley Swainson's hawks prey on small mammals, birds, toads, crayfish, and insects.

During the breeding season, Swainson's hawks form monogamous pairs and will defend territories against conspecifics (Estep 1989). The clutch size is typically one to four eggs (Fitzner 1980; England et al. 1997). In general, Central Valley Swainson's hawks will have a single clutch, which will be completed by mid-April (Estep 1989). Rarely does this species attempt to re-nest if first nest attempt fails. The majority of the North American Swainson's hawk population migrates each winter to Central or South America; a small number of birds (10 to 30 individuals, largely adults) winter in the Sacramento–San Joaquin River Delta each year (Herzog 1996).

Presence in the APWRA

The CNDDB (2012) documents two occurrences of Swainson's hawk within 10 miles of the Project Area (Map 2), but it does not document any Swainson's hawks nesting in the Project Area or within the APWRA. However, Swainson's hawk nests have been documented within approximately 5 miles of the Project Area (Contra Costa County Department of Conservation and Development 2010). In 2003, an active nest was observed on Old River, at the southeast corner of Clifton Court Forebay. In 2006, a pair was observed nesting southeast of Brentwood, 0.25 mile west of the intersection of Kellogg Creek and Bixler roads. A third active nest was recorded in 2009 on private property, near the intersection of Bruns and Christensen Road (CNDDB 2012). Additionally, observations of foraging Swainson's hawk have been made during surveys conducted by the ACAFMT (ICF International 2012b).

Map 2. Focal Species CNDDB Occurrences within 10 Miles of the Project Area



3.0 Impact Assessment

This APP uses data from post-construction monitoring studies for pre- and post-repowering projects within the APWRA to develop an approach for estimating the number of turbine-related fatalities for birds and to provide an estimate of impacts under a scenario in which all of the Project Area is repowered. This chapter begins with an overview of existing fatality estimates (Section 3.1), and is followed by a discussion of post-repowering impacts, or potential future effects (Section 3.2). This analysis is directed at each of the focal species, although some data are presented as generalized impacts to raptors and/or resident and migratory birds. This impact assessment focuses on the direct impact from the operation of repowered turbines in the Project Area. The Repowering EIR addresses indirect effects of repowering such as displacement from habitat loss as well as effects from other repowering-related activities, such as construction or maintenance; however, this APP does seek to minimize effects from these activities through measures detailed in *5.0 Conservation Measures*. This analysis serves as a program-level impact assessment; the project-specific requirements in *4.0 Risk Assessment* and *6.0 Monitoring and Adaptive Management* will provide more accurate and current information on impacts to bird species as a result of repowering the Project Area.

3.1 Pre-Repowering Fatality Estimates

Over 20 years of avian fatality monitoring has taken place within the APWRA (Smallwood and Thelander 2008; ICF International 2012a), and turbine-related fatalities for birds are well documented. Pre-repowering fatality monitoring shows that golden eagles, red-tailed hawks, American kestrels, burrowing owls, barn owls, prairie falcons, and a diverse mix of non-raptor species are killed each year in turbine-related incidents (Howell and DiDonato 1991; Orloff and Flannery 1996; Howell 1997; Smallwood and Thelander 2004; Smallwood 2010; ICF International 2012a).

The ACAFMT has monitored turbines throughout the APWRA (see *1.4.2 Monitoring Program*) since 2005; this monitoring data provides an estimate of existing fatality rates, or baseline, for bird impacts throughout the APWRA. Table 1 presents fatality rate estimates from monitored first- and second-generation (non-repowered) turbines in the APWRA. Table 2 presents the annual fatality rates from all monitored turbines in the APWRA (including Diablo Winds turbines but not Buena Vista turbines) as an indicator of existing impacts to bird species in the Project Area. Table 2 presents estimates of avian impacts from existing turbines in the Project Area and a fully repowered Project Area.

3.2 Post-Repowering Fatality Estimates

Smallwood and Thelander (2004) concluded that the most effective way to reduce bird fatalities in the APWRA is to replace the numerous small turbines currently installed with fewer, larger turbines that generate more energy per turbine. They acknowledged, however, that the effect of repowering on birds was relatively unknown in 2004. Due to changes in technology (e.g., turbine height, distance of rotor to ground, rotations per minute, etc.) as well as revised siting (e.g., strings versus individual placement), the fatality rate under a repowered scenario is expected to be significantly reduced (ICF International 2012a; Smallwood 2010; Smallwood and Karas 2009; Insignia Environmental 2012). In addition, it is possible that different species will be impacted by old- versus current-generation turbines.

Several studies have been conducted to predict the effect of repowering within the APWRA. Monitoring data for the Diablo Winds repowering project (repowered in 2004) from Smallwood and Karas (2009) indicate that fatality rates were 54% and 66% lower for raptors and all birds, respectively, relative to concurrently operating first- and second-generation turbines (2005–2007). Additionally, they predicted that repowering across the APWRA could produce similar reductions for raptors and all birds in general (54% and 65%, respectively). Smallwood (2010) used fatality data from 2005 to 2009 throughout the APWRA to develop multiple baseline fatality-rate estimates, and he compared those to predicted fatality rates at the proposed Tres Vaqueros repowering project in Contra Costa County. He concluded that current-generation turbines would reduce fatality rates by 65% and 61% for raptors and all birds, respectively.

The ACAFMT compared the average of annual adjusted fatality rates at the Diablo Winds and Buena Vista repowering projects to non-repowered turbines across the APWRA to determine if repowering may reduce the number of turbine related fatalities for American kestrel, burrowing owl, golden eagle, and red-tailed hawk (ICF International 2012a). The estimates of the adjusted fatalities rates for the Diablo Winds turbines were significantly lower than the corresponding estimates for the non-Diablo turbines for all species, except burrowing owl, the only species with overlapping 95 percent confidence intervals. The decrease was greatest for golden eagle (89%) followed by American kestrel (88%), red-tailed hawk (36%) and burrowing owl (19%). For the four species as a whole, the decrease was 46%. Reductions were even greater for the Buena Vista site for red-tailed hawk (77%) and burrowing owl (100%, no burrowing owl fatalities were detected at the Buena Vista site). However, the decrease in fatalities for American kestrel and golden eagle were not as great at Buena Vista turbines as they were at Diablo Winds turbines (ICF International 2012a).

It should be noted that the studies estimating fatality rates for repowered turbines summarized above were conducted at current-generation turbines ranging from 660 kW (Diablo Winds) to 1 megawatt (MW) (Buena Vista). Newer turbines used for future repowering will further increase the size and rated capacity of turbines. The repowering project at Vasco Winds is using 2.3 MW turbines, and other projects may use up to 3 MW turbines. Some evidence exists that these larger turbines will continue to reduce fatality rates per MW for birds species currently killed at the APWRA (Smallwood 2010). However, there remains a possibility that larger turbines may affect bird species left unaffected by older (i.e., smaller) turbines. In addition, fatality rates in the APWRA are highly variable (e.g., species impacts may differ between sites due to different levels of use between sites) and potentially imprecise (ICF International 2012a; Smallwood 2010). Nonetheless, these two repowering projects represent the best available science locally to understand the potential reduction in avian mortality associated with repowering and as such, these projects are used to form the bases for reduction estimates.

Tables 1 and 2 summarize estimated fatality rate trends for all monitored turbines in the APWRA, only non-repowered turbines, and repowered turbines (Diablo Winds and Buena Vista). Table 1 depicts the difference in annual estimated fatality rates between non-repowered and repowered turbines. Detection probabilities based on Smallwood (2007), as described in ICF International (2012a), were used in Table 1 in order to include Buena Vista monitoring data in this comparison. Table 2 depicts fatality rates for all monitored turbines and for Diablo Winds turbines using the Quality Control/Quality Assurance (QAQC) detection probabilities (see ICF International [2012a] for an explanation of the QAQC study). The QAQC detection probabilities, generated from a study to provide better estimates of the probability of detecting a fatality that more directly apply to the APWRA monitoring program, provide more accurate fatality rate estimates, and are therefore the rates used to estimate annual fatalities under existing conditions (all monitored turbines in the APWRA since 2005), a non-repowered scenario, and a repowered scenario. Compared to the modified Smallwood (2007) detection probabilities, the QAQC detection probabilities tend to result in lower fatality estimates for larger birds (e.g., golden eagle, red-tailed hawk) and higher fatality estimates for smaller birds (e.g., American kestrel, burrowing owl). QAQC fatality estimates are not available for the Buena Vista repowering project.

Sections 3.3.1–3.3.8 describe potential impacts to each focal species from turbine-related mortality in the Project Area under a fully repowered scenario. Overall bird use observations and all identified species with documented fatalities in the APWRA, including Diablo Winds and Buena Vista repowering projects, are presented in Appendix A.

Table 1. Annual Adjusted Fatality Rates for Non-repowered and Repowered APWRA Turbines

Species	Non-Repowered (Average Annual Fatalities/MW [95% CI])[a]	Repowered (Average Annual Fatalities/MW [95% CI])	
		Diablo Winds[b]	Buena Vista[c]
American kestrel	0.76 (0.46-1.06)	0.09 (0.06-0.12)	0.15 (0.06–0.24)
Barn owl	0.14 (0.12-0.17)	0.02 (0.02-0.02)	NA[d]
Burrowing owl	0.99 (0.60-1.38)	0.84 (0.53-1.16)	0.00 (0.00-0.00)[e]
Golden eagle	0.09 (0.07-0.10)	0.01 (0.01-0.01)	0. 04 (0.01–0.07)
Loggerhead shrike	0.01 (0.00-0.10)	0.00 (0.00-0.00)	0.00 (0.00-0.00)[e]
Prairie falcon	0.01 (0.00-0.01)	0.00 (0.00-0.00)	NA[d]
Red-tailed hawk	0.32 (0.26-0.38)	0.20 (0.17-0.24)	0. 10 (0.05–0.15)
Swainson's hawk	0.00 (0.00-0.00)	0.00 (0.00-0.00)	0.00 (0.00-0.00)[e]
All raptors	2.39 (1.59-3.20)	1.21 (0.80-1.61)	0.31[f]
All native non-raptors	6.71 (0.04-13.37)	2.51 (0.20-4.81)	1.01[f]

Note: See Figures 1a and 1b for a graphical depiction of these data.

Source: ICF International (2012a, 2012b) and Insignia Environmental (2012).

CI confidence interval

NA Adjusted fatality rates not available. One barn owl fatality and one prairie falcon fatality were documented at Buena Vista (Insignia Environmental 2012).

[a] Fatality rates were averaged across monitored turbine operating groups that do not contain repowered turbines for the bird years 2005 through 2010 (October 1 through September 30) based on modified Smallwood (2007) detection probabilities (ICF International 2012a).

[b] Fatality rates were calculated using Diablo Winds turbines only for the 2005 through 2010 bird years based on modified Smallwood (2007) detection probabilities (ICF International 2012b).

[c] Fatality rates based on monitoring conducted from February 2008 through January 2011 based on modified Smallwood (2007) detection probabilities (ICF International 2012a).

[d] One documented fatality.

[e] No documented fatalities.

[f] Confidence intervals not available.

Table 2. Estimated Fatalities per Year for Existing and Repowered Project Area

Species	Project Area 2005-2010 Average (95%CI) [a]	Repowered Project Area Based on Diablo Winds 2005-2009 Average (95%CI)[b]	Percent Decrease (%)	Repowered Project Area Based on Buena Vista 2008-2011 Average (95%CI)[c]	Percent Decrease (%)
American kestrel	227.7 (158.2-297.3)	27.2 (18.9-35.6)	88.0	62.5 (25.0-99.9)	72.6
Barn owl	89.8 (67.8-111.8)	14.2 (11.6-16.7)	84.2	NA[d]	–
Burrowing owl	279.7 (183.0-376.3)	264.8 (178.5-351.1)	5.3	0.0 (0.0-0.0)	100.0
Golden eagle	41.8 (34.5-49.0)	4.5 (4.1-4.9)	89.2	16.7 (4.2-29.1)	60.1
Loggerhead shrike	54.9 (25.7-84.1)	0.0 (101.7-142.2)	100.0	0.0 (0.0-0.0)	100.0
Prairie falcon	5.0 (3.0-7.1)	0.0 (0.0-0.0)	100.0	NA[d]	–
Red-tailed hawk	185.5 (145.3-225.7)	122.0 (332.2-573-2)	34.2	41.6 (20.8-62.5)	77.6
Swainson's hawk	0.69 (0.18-0.50)	0.0 (0.0-0.0)	100.0	0.0 (0.0-0.0)	100.0
All raptors	865.2 (246.0-619.2)	452.7 (332.2-573.2)	47.7	128.0[d]	85.2
All native non-raptors	1,355.27 (732.2-1,978.3)	739.1 (404.0-1,074.1)	45.5	422.3[d]	68.8

Note: See Figures 2a and 2b for a graphical depiction of these data.

Source: ICF International (2012a), ICF International (2012b), Insignia Environmental (2012)

CI Confidence interval

NA Adjusted fatalities rates not available. Post-construction monitoring documented one fatality.

[a] Annual fatalities were averaged across all monitored turbine operating groups in the Project Area, including Diablo Winds turbines, for the 2005 through 2010 bird years (October 1 through September 30) using the Quality Assurance/Quality Control (QAQC) detection probabilities (ICF International 2012a).

[b] Average annual fatalities for the 2005 through 2009 bird years using the QAQC detection probabilities (ICF International 2012a) were multiplied by the maximum allowed installed capacity of the Project Area, 416.4 megawatts, as documented in County of Alameda Community Development Department (1998).

[c] Average annual fatalities from 2008 through 2011 based on modified Smallwood (2007) detection probabilities (ICF International 2012a) were multiplied by the maximum allowed installed capacity of the Project Area, 416.4 megawatts, as documented in County of Alameda Community Development Department (1998).

[d] Annual fatalities from Insignia Environmental (2012). Confidence intervals not available.

3.3 Focal Species Impact Assessment

3.3.1 American Kestrel Impact Assessment

Estimate of Fatalities

As shown in Table 2, a fully repowered Project Area is estimated to result in 27 American kestrel fatalities per year (0.07 fatalities/MW/year) based on Diablo Winds monitoring data (ICF International 2012b), or 62 fatalities per year (0.15 fatalities per MW per year) based on Buena Vista monitoring data (ICF International 2012b). Based on these projections, repowering the Project Area could decrease the average annual fatalities of American kestrels by 88 percent or 73 percent, respectively. Over a 30-year CUP permit term, approximately 566 to 1067 American kestrel fatalities are anticipated, based on the 95 percent confidence interval of the annual fatality rate at Diablo Winds turbines. The 95 percent confidence interval of the Buena Vista fatality estimate would project 749 to 2,998 kestrel fatalities per year from a repowered Project Area.

Potential Impact of Repowering

The North American population of American kestrels is estimated at more than 4,000,000 birds, representing 75 percent of the global population (Hawk Mountain 2007). Populations have declined over the western U.S. since the 1980s, pronouncedly so since the 1990s (Hawk Mountain 2007). This trend is also apparent for California's foothill and Central Valley populations (Sauer et al. 2008). North American Breeding Bird Survey (BBS) data indicate a decline in American kestrels for Coastal California and the state as a whole (Sauer et al. 2011), as do Christmas Bird Count data for California (National Audubon Society 2011).

Based on the estimated annual fatalities in Table 2, adverse effects to American kestrel from wind turbines will substantially decrease with repowering in the Project Area. In addition, the conservation measures in *5.0 Conservation Measures* will further limit prey availability and reduce the number of potential perch sites in the Project Area, potentially reducing the exposure of American kestrels to turbine hazards. Furthermore, the wind-swept zone of repowered turbines will be higher off the ground, potentially reducing the risk to kestrels, as they are generally perch and pounce predators, perching lower in higher wind speeds (see Section 2.2.1.1).

Annual fatality rates for American kestrel in the APWRA from 2005 to 2010, in the range of 0.34 to 0.59 fatalities/MW/year, do not indicate any trend (ICF International 2012a). Considering that American kestrel fatalities are likely to substantially decline with repowering (ICF International 2012a; Smallwood 2010; Smallwood et al. 2009), repowering the Project Area is unlikely to have adverse impacts on American kestrels at the population level.

3.3.2 Barn Owl Impact Assessment

Estimate of Fatalities

As shown in Table 2, a fully repowered Project Area is estimated to result in 14 barn owl fatalities per year (0.03 fatalities/MW/year) based on Diablo Winds monitoring data (ICF International 2012b). No adjusted fatality rate for barn owls is available from Buena Vista, although post-construction monitoring from 2008 to 2011 documented only a single fatality. Based on Diablo

Winds monitoring projection, repowering the Project Area could decrease the average annual fatalities of barn owls by 84 percent. Over a 30-year CUP permit term, approximately 349 to 501 barn owl fatalities are anticipated, based on the 95% confidence interval of the average annual fatality rate at Diablo Winds.

Potential Impact of Repowering

Barn owls are common in California with a stable population in the state (Audubon California 2010). Although BBS results may indicate a declining population in the state (Sauer et al. 2011), the data are of limited creditability due to sampling deficiencies (Sauer et al. 2011). Barn owls are used throughout California for rodent control in orchards and vineyards (Barn Owl Box Company 2012). It is uncertain what the effect of repowering the Project Area will have on local barn owl populations. The higher wind-swept zone of repowered turbines may reduce the risk of turbine collision as most hunting is done in low quartering flights at about 1.5-4.5 meters above the ground (Marti 2005). The conservation measures in *5.0 Conservation Measures* will also reduce the perch availability in the Project Area. It is unclear what the effects of the estimated 349 to 501 turbine-related fatalities of barn owls over a 30-year period will have on the local population, but the species' relative abundance in the state would indicate that fatalities as a result of repowering would be unlikely to have adverse impacts on the species at the population level.

3.3.3 Burrowing Owl Impact Assessment

Estimate of Fatalities

As shown in Table 2, a fully repowered Project Area is estimated to result in 265 burrowing owl fatalities per year (0.64 fatalities/MW/year) based on Diablo Winds monitoring data (ICF International 2012b). As shown in the table, this rate would result in a 5 percent decrease in burrowing owl fatalities per year. Over a 30-year CUP permit term, approximately 5,490 to 11,290 burrowing owl fatalities are anticipated, based on the 95 percent confidence interval of the average annual fatality rate at Diablo Winds. However, post-construction monitoring at the Buena Vista repowering project of a three-year period did not document a turbine-related burrowing owl fatality, indicating highly variable burrowing owl abundance in the Project Area and suggesting the fatality estimate from Diablo Winds monitoring may overstate the number of fatalities resulting from a fully repowered Project Area.

Potential Impact of Repowering

Focused surveys in Contra Costa County in 2006 on 3.3 mi² and 2007 on 4.4 mi² in the APWRA found 56 pairs and 67 pairs, respectively (Barclay and Harman 2008 unpublished data), suggesting that the APWRA could support several hundred pairs of burrowing owls dispersed in clumps. Smallwood et al.'s (2012) surveys in 2011 and 2012 estimated approximately 500 to 600 breeding pairs, ranging in density from 0 to approximately 28 breeding pairs per km². Since this species has been extirpated from much of the San Francisco Bay Area, it is believed that the APWRA may contain the largest number of breeding pairs in the San Francisco Bay Area (Barclay and Harman 2008 unpublished data). Studies of burrowing owls in the APWRA have suggested that turbine-related mortalities may lower adult and juvenile survivorship sufficiently to make the local population not self-sustaining in some years (Smallwood et al. 2008), but recent surveys indicate that burrowing owl abundance in the APWRA may be much greater than previously estimated (Smallwood et al. 2012).

Monitoring at Diablo Winds indicates only a slight reduction in annual fatalities in a fully repowered Project Area (Table 2). However, these estimates are based on monitoring at Diablo Winds turbines only, which may not be an accurate characterization of the risk to burrowing owls from repowering the Project Area. For example, the higher wind-swept area of repowered turbines (Diablo Winds turbines are smaller than current generation turbines to be installed; see Section 2.1.2) is likely to reduce the exposure of the species to turbine collisions. The species feeds primarily on the ground from both perch and by hovering low to the ground. Hunting typically occurs at about 33 feet (10 meters) above ground, while direct flights back to the nest (prey delivery) are 3 to 6 feet (1 to 2 meters) (Haug, et al. 2011) limiting exposure to the higher wind-swept zone of repowered turbines. Furthermore, results of post-construction mortality monitoring over 3 years at the Buena Vista repowering project (i.e., taller turbines) recorded zero burrowing owl fatalities (Insignia Environmental 2012). Considering the evidence of burrowing owl density in the APWRA may be greater than previous estimates (Barclay and Harman 2008 unpublished data) and that burrowing owls may be at less risk of turbine collision from repowering (Smallwood 2010; Smallwood et al. 2009; Insignia Environmental 2012), the proposed project is unlikely to have an adverse impact to burrowing owls at the population level.

3.3.4 Golden Eagle Impact Assessment

Estimate of Fatalities

As shown in Table 2, a fully repowered Project Area is estimated to result in 5 golden eagle fatalities per year (0.01 fatalities/MW/year) based on Diablo Winds monitoring data (ICF International 2012b), or 17 fatalities per year (0.04 fatalities/MW/ year) based on Buena Vista monitoring data (ICF International 2012b). Based on these projections, repowering the Project Area could decrease the average annual fatalities of golden eagles by 89 percent or 61 percent, respectively. Over a 30-year CUP permit term, approximately 122 to 148 golden eagle fatalities are anticipated, based on the 95% confidence interval of the average annual fatality rate at Diablo Winds. The 95 percent confidence interval of the Buena Vista fatality estimate would project 125 to 875 golden eagle fatalities over the permit term.

Potential Impact of Repowering

Portions of the Diablo Range in southern Alameda County and eastern Contra Costa County support some of the highest known densities of golden eagle nesting territories in the world (Hunt and Hunt 2006). In the past 15 years, several comprehensive studies, discussed below, estimated territory occupancy (number of breeding pairs), assessed reproductive rates, and monitored juvenile, sub-adult, and floater[9] range and mortality.

Hunt (2002) examined data collected data over a 7-year period between 1994 and 2002 that included the monitoring of 60 to 70 active territories within 30 km (11.6 miles) of the APWRA. In 2005, these territories were found to still be 100% occupied (Hunt and Hunt 2006). The conclusions of these studies were that the golden eagle population remains stable (Hunt 2002; Hunt and Hunt 2006). In addition, the studies found no increase in the number of actively breeding sub-adults, indicating that there are enough floaters to buffer any loss of breeding adults (Hunt 2002; Hunt and Hunt 2006). The conclusion of a stable golden eagle population in the APWRA vicinity is supported

[9] A juvenile is 3-15 months of age, a sub-adult is 1 to 3 years of age, and a floater is a non-breeding, non-territorial adult individual over 4 years of age (Hunt 2002).

by the results of a population dynamics model that used reproduction rates and fatality rates, among other variables (Hunt 2002). However, the model results also suggested that the number of estimated annual fatalities used in the model, 50 individuals, could not be sustained by the number of breeding adults when considering the loss of reproductive potential incurred by each eagle fatality (Hunt and Hunt 2006). Although the vacant territories are filled by floaters and subadults to stabilize the APWRA population, because the population demands a flow of recruits from outside the area to fill breeding vacancies as they occur, it can be considered a population sink. The researchers conclude, therefore, that turbine-related mortality reduces the resilience of the local golden eagle population.

Table 2 shows an estimated 4 to 5 fatalities per year in a fully repowered Project Area, less than 10 percent of the 50 fatalities estimated for the Hunt (2002) model. This fatality estimate is only based upon monitoring at Diablo Winds turbines, and does not incorporate data from Buena Vista repowering project post-construction monitoring. The Buena Vista repowering project is located to the north of the Project Area and is closer to the watershed lands surrounding Los Vaqueros reservoir (Map 1) where the densest area of golden eagle nests in the APWRA exists (Figure 2). The fatality estimate using Buena Vista data has a wide range based on its 95 percent confidence interval, predicting 4 to 29 golden eagle fatalities per year from a fully repowered project area. These annual fatality estimates, when compared to current conditions, would indicate the repowering the Project Area would reduce golden eagle fatalities and increase the potential for restoring a self-sustaining local breeding population.

3.3.5 Loggerhead Shrike Impact Assessment

Estimate of Fatalities

No documented fatalities of loggerhead shrikes have occurred at Diablo Winds or Buena Vista repowering projects, so it is difficult to predict the annual fatalities that could occur from a fully repowered Project Area; however, the lack of documented fatalities would suggest a reduced level of fatality risk from current conditions, based on the average of 55 estimated fatalities per year in the Project Area from 2005 to 2010 (Table 2).

Potential Impact of Repowering

Grinnell and Wythe (1927) (as cited in Shuford and Gardali 2008) described loggerhead shrike as an "abundant" resident in the San Francisco Bay region. However, birds have been extirpated locally or reduced in numbers by habitat loss (Shuford and Gardali 2008). BBS data for California's shrike population show a negative trend from 1968 to 2010 (Sauer et al. 2011). Due to the lack of documented fatalities at repowered facilities in the Project Area, it is difficult to determine how a fully repowered scenario may impact the regional loggerhead shrike population. Minimizing available perches through conservation measures presented in *5.0 Conservation Measures* and increasing the height of the rotor swept zone of repowered turbines may reduce the risk of turbine collisions for the species, as they mostly take prey on the ground (see Section 2.2.1.5). Careful monitoring of fatalities, ensuring that the protocols implemented are likely to detect loggerhead shrike fatalities, will be important for understanding impacts to this species and implementing adaptive management measures, as appropriate.

3.3.6 Prairie Falcon Impact Assessment

Estimate of Fatalities

No documented fatalities of prairie falcons have occurred at the Diablo Winds project, and only a single fatality over 3 years of post-construction monitoring has occurred at the Buena Vista repowering project, so it is difficult to predict the annual fatalities that may occur from a fully repowered Project Area; however, the lack of documented fatalities would suggest a reduced level of fatality risk from current conditions, based on the average of 5 estimated fatalities per year in the Project Area from 2005 to 2010 (Table 2).

Potential Impact of Repowering

Across North America, the prairie falcon population is stable but experiencing local declines; in California, the species is vulnerable to extirpation (NatureServe 2012). Within the APWRA and its vicinity, the species is somewhat rare, with less than three yearly sightings in the region during summer BBS counts from 2006 to 2010 (Sauer et al. 2011). State-wide, however, BBS trends may indicate an increase in abundance, although the data are of limited credibility due to the small sample size (Sauer et al. 2011). Due to the lack of documented fatalities at repowered facilities in the Project Area, it is difficult to determine how a fully repowered scenario may impact the regional prairie falcon population. The species employs a variety of foraging flight characteristics, including high soaring, making it difficult to hypothesize how repowered turbines may affect its risk of turbine collision. The conservation measures in *5.0 Conservation Measures* that minimize perches will help to discourage prairie falcon use of the Project Area, however. Careful monitoring of fatalities for this species, ensuring that monitoring protocols are likely to detect prairie falcon fatalities, will be important for monitoring impacts to this species and implementing adaptive management measures, as appropriate.

3.3.7 Red-tailed Hawk Impact Assessment

Estimate of Fatalities

As shown in Table 2, a fully repowered Project Area is estimated to result in 122 red-tailed hawk fatalities per year (0.29 fatalities/MW/year) based on Diablo Winds monitoring data (ICF International 2012b), or 42 fatalities per year (0.10 fatalities per MW per year) based on Buena Vista monitoring data (ICF International 2012b). Based on these projections, repowering the Project Area could decrease the average annual fatalities of red-tailed hawks by 34 percent or 78 percent, respectively. Over a 30-year CUP permit term, approximately 4,358 to 6,772 red-tailed hawk fatalities are anticipated, based on the 95 percent confidence interval of the average annual fatality rate at Diablo Winds. The 95 percent confidence interval of the Buena Vista fatality estimate would project 625 to 1,874 red-tailed hawk fatalities per year.

Potential Impact of Repowering

An estimated 89 percent of the global population of red-tailed hawks is found in North America, with approximately 1,960,000 breeding birds (Hawk Mountain 2007). Populations have remained stable or increased throughout most of the western United States since the 1980s, growing 1.5 percent in California between 1983 and 2005 (Hawk Mountain 2007; Sauer et al. 2008).

California foothill populations have remained stable since 1968, while the Central Valley population has significantly increased (Sauer et al. 2008).

Although a substantial number of red-tailed hawk fatalities occur in the APWRA, the annual fatalities have shown a generally decreasing trend since 2005 (ICF International 2012a) and is predicted to continue to decline as repowering proceeds in the APWRA (Smallwood 2010; ICF International 2012a). The yearly fatalities for red-tailed hawks presented in Table 2 coincide with these other studies, suggesting that repowering the Project Area is likely to continue to decrease the amount of red-tailed hawks killed each year. Considering that red-tailed hawk population in California has grown while APWRA has been in operation, continued operation of repowered turbines in the Project Area is unlikely to have any population-level impacts to red-tailed hawks.

3.3.8 Swainson's Hawk Impact Assessment

Estimate of Fatalities

There is only one recorded Swainson's hawk fatality at the APWRA from the 2005 bird year (ICF International 2012a), resulting an annual fatality rate estimate of approximately zero (Table 2). Smallwood (2010) estimated less than one Swainson's hawk fatality per year at the APWRA. Furthermore, no Swainson's hawk fatalities were detected during 3 years of post-construction monitoring at the Buena Vista repowering project, or during 4 years of monitoring at the Diablo Winds repowering project.

Potential Impact of Repowering

Swainson's hawk is one of two (the other is sandhill crane) state-listed species that has a recorded fatality in the APWRA (ICF International 2012a). While the Project Area does not provide prime nesting or foraging habitat for the Swainson's hawk, neighboring agricultural areas in the most northeastern corner of Alameda County and north of the APWRA in Contra Costa County do provide prime foraging habitat, and Swainson's hawk may cross into the Project Area occasionally. The Audubon Society (2007) includes Swainson's hawk on its Watch List as a declining or rare species of national conservation concern. Evidence from egg collections suggests that the California population has been reduced by as much as 90% from its estimated historical levels (Bloom 1980). This severe population decline in the Central Valley of California is corroborated by microsatellite analyses of DNA which suggest that the decline has taken place over 68–75 generations, or about 200 years, which corresponds with the time of European settlement (Hull et al. 2008; Audubon Society 2007). Based upon migration counts in Vera Cruz, Mexico, the present global population may approach 1 million individuals (HawkWatch International 2009). The California population is estimated to be over 1,900 nesting pairs, 95 percent of which are in the Central Valley (Anderson et al. 2007). The BBS reports a rising California population since surveys began in 1968, but also reports that important deficiencies in the underlying data may make these trends inaccurate (Sauer et al. 2011).

The very small number of estimated fatalities at the APWRA compared to the size of the local population east of the Project Area in the Central Valley indicates that turbine-related fatalities in the Project Area are unlikely to have an adverse effect on the local Swainson's hawk population. Subsequent project-level avian use and fatality studies will continue to provide data for assessing the effect of turbine operation on the Swainson's hawk population in the area.

3.4 Cumulative Impacts

*[**Note to Reader:** A cumulative impacts analysis will be completed as part of the EIR. This section will be updated after text is developed and reviewed for the EIR.]*

CEQA requires an evaluation of cumulative impacts that considers the combination of the project evaluated in the EIR together with other projects causing related impacts. Other projects considered should include past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the Lead Agency. The Lead Agency defines the geographic scope of the area within which cumulative effects will be evaluated, but also provides a reasonable explanation for the geographic limitation used. Finally, the cumulative effects analysis must examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects.

In addition, the USFWS Land-based Wind Guidelines (U.S. Fish and Wildlife Service 2012a) advise that cumulative impacts should be incorporated into wind energy planning, including a review of the range of development-related impacts and identification of those species of concern or their habitats most at risk.

USFWS consideration of the cumulative impacts of eagle take permits is described in the Draft ECP Guidance. Cumulative impacts are defined as: “the incremental environmental impact or effect of the proposed action, together with impacts of past, present, and reasonably foreseeable future actions” (50 CFR 22.3). Should project proponents pursue eagle take permits, the Draft ECP Guidance notes that a thorough cumulative impact analysis will be conducted under the NEPA process associated with an eagle permit, consistent with the principles of cumulative impacts outlined in the Council on Environmental Quality handbook and compatible with eagle preservation, including indirect impacts. The geographic scale for the analysis of cumulative impacts of wind facility projects and associated permits will be determined by the USFWS and project proponent on a case-by-case basis (U.S. Fish and Wildlife Service 2011).

PART 2
PROJECT-SPECIFIC REQUIREMENTS

Repowering will not eliminate all impacts to birds, and Part 2 of this APP describes measures to avoid or minimize the effects of construction, operation, and decommissioning of wind turbines within the Project Area. Project-level requirements are needed, in addition to the programmatic analysis provided above, to mitigate for impacts identified through the CEQA process, to comply with BGEPA, to adhere to federal and state guidelines, and to develop an avian conservation strategy that is consistent with USFWS guidance. Table 3 outlines where various sections of this APP address the stages of Draft ECP Guidance (U.S. Fish and Wildlife Service 2011).

The following project-level requirements are aimed at avoiding and minimizing impacts to avian species from repowering projects and providing the data necessary to comply with federal, state, and county regulations and guidelines. To that end, the APP establishes the following goals for repowering projects in the Project Area:

Goal 1. Avoid and minimize impacts to bird species. *5.0 Conservation Measures* identifies specific measures to avoid and minimize impacts to birds.

Goal 2. Reduce and document the number of raptor fatalities. *4.4 Preconstruction Fatality Estimate* provides guidance for estimating fatalities for all focal species from proposed repowering projects prior to project construction. *6.0 Monitoring and Adaptive Management* provides a detailed description of the monitoring protocols to be included in the project proponent post-construction monitoring plan to evaluate post-construction fatalities against preconstruction estimated fatalities. The ACAFMT will continue to evaluate raptor fatality reduction for the American kestrel, burrowing owl, golden eagle, and red-tailed hawk according to the 2007 Settlement Agreement.

Goal 3. Mitigate for direct impacts to birds that cannot be avoided. *5.2 Compensatory Mitigation* identifies conservation measures required to provide compensation when significant adverse impacts to species of concern cannot be avoided.

Goal 4. Use post-construction monitoring data to inform adaptive management. *6.0 Monitoring and Adaptive Management* identifies monitoring requirements for risk assessment validation and an adaptive management framework that requires implementation of additional conservation measures according to fatality thresholds.

Implementation Oversight

*[**Note to Reader**: This section provides a framework for technical oversight of the implementation of the APP. The framework described below is only preliminary, meant to serve as an initial basis for discussion with the APWRA Steering Committee.]*

The APP Technical Advisory Committee (TAC) will ensure the proper implementation of the APP to achieve the program's goals. The TAC will have the primary oversight responsibility to ensure that wind-energy project operators are complying with the monitoring and reporting requirements set forth by the APP.

The TAC will have a standing meeting every 6 months to review monitoring reports produced by operators in the Project Area. The TAC will use these meetings to discuss any issues raised by the monitoring reports and determine next steps to address issues, including scheduling additional meetings, if necessary. TAC members will include representatives from the County (including a technical consultant contracted by the County at its discretion), wildlife agencies (CDFW, USFWS), and representatives from repowered wind-energy operators in Alameda County. Additional TAC members may also be considered such as a representative from Audubon or a landowner. The TAC will be a voluntary and advisory group that will support decisions made by the County. As such, the TAC is not a decision-making body and will not be bound to the public noticing requirements of the Brown Act. However, to maintain transparency with the public, all TAC meetings will be open to the public and notice of meetings will be given to interested parties.

The TAC has two primary roles: 1) to review project planning documents to ensure that project-specific AMMs and compensatory mitigation measures described in this APP are appropriately applied, and 2) to review monitoring documents (protocols and reporting) for consistency with this APP. Thorough implementation of monitoring results review requires that the TAC have a direct relationship with the entities conducting field monitoring and developing the monitoring reports (most likely these entities will be third party contractors hired by the County or the wind operators). Upon completion of annual reports, the monitoring entities will provide the reports as well as an oral summary of the results directly to the TAC and will respond to questions raised by the TAC.

Should fatality monitoring reveal that impacts exceed thresholds established in *6.2 Adaptive Management*, the TAC will advise the County on requiring the implementation of adaptive management measures. The TAC, in this instance, also may convene a panel of experts in an advisory role. The expert panel will primarily be responsible for, at the request of the TAC, formulating adaptive management measures to be implemented by wind-energy project operators, as directed by the County, when impact thresholds are exceeded. The expert panel may include experts in the field of wind-wildlife interactions (i.e., scientists), other wildlife agency representatives, or consultants contracted by the County to be determined by the County in consultation with the TAC. The County will have the ultimate decision-making authority, as it is the organization issuing the CUPs. However, the TAC will collaboratively inform the decisions of the County.

The monitoring necessary to implement the project-specific measures of this plan will also require funding from project proponents. Additionally, this APP recommends monetary contributions to fund compensatory mitigation measures. The project-specific measures outlined in this APP, unless otherwise indicated, are required. However, the monetary amounts included in Table 3 are estimates of the costs for implementing project-specific monitoring and compensatory mitigation measures; they are not mandatory fees imposed by the County. Should the County require fees to be paid by proponents for an issuance of a CUP, a nexus study would be performed in accordance with the California Mitigation Fee Act. The monetary values estimated in Table 3 will depend on how project proponents choose to implement the required measures; this information is provided to help project proponents forecast the potential costs of adhering to the requirements of this APP in order to obtain a CUP.

Table 3. Summary of Cost Estimates to Implement Project-Specific Measures

Cost	Logic	Conditional/Required	Variable/Fixed	Location in Document
$2,225 - $3,500	Annual cost per turbine for preconstruction avian use surveys.[1]	Conditional	Variable	4.2 *Avian Behavior and Use Data*.
$14,500 - $19,200	Annual cost per turbine for post-construction monitoring[2]	Required	Variable	*6.1 Post-Construction Monitoring*
$2,000	Cost per fatality in exceedance of thresholds in Table 4 for the second consecutive year to fund research	Conditional	Fixed	*6.2 Adaptive Management*
$225,000	Cost per eagle fatality based on USFWS Resource Equivalency Analysis assuming 30 power pole retrofits per eagle fatality at the cost of $7,500 per pole	Conditional	Variable	*5.2 Compensatory Mitigation*
$580	Average cost to rehabilitee a raptor at the California Raptor Center, to be paid for each estimated raptor fatality.	Conditional	Fixed	*5.2 Compensatory Mitigation*

Note: This table does not include the fee required to fund a golden eagle inventory around the Project Area, as a population study is ongoing and will likely negate the need for further funding for such a study (see *Note to Reader* in *4.3 Golden Eagle Inventory*).

[1] Assumes one observation point is needed for every 2 turbines. Per turbine costs based on the scaled costs as follows: 10 observation points costs $70,630 per year; 40 observation points costs $177,880 per year.

[2] Scaled based on the following cost framework: 10 Turbines and 4 avian obs points = $114,400 (carcass searches) + $14,300 (avian use) + $63,400 (other administrative costs) = $192,100 total; 20 turbines and 8 avian obs points = $228,800 (carcass searches) + $28,600 (avian use) + $63,400 (other administrative costs) = $320,800 total; 40 turbines and 16 avian obs points =$457,600 (carcass searches) + $57,200 (avian use) + $63,400 (other administrative costs) = $578,200.

Table 4. Eagle Conservation Plan Guidelines as they Apply to the Avian Protection Program

	Objective	Actions	Addressed in APP
Stage 1	Identify potential wind facility locations with manageable risk to eagles at the landscape level.	Broad, landscape-scale evaluation.	Not applicable to repowering the Project Area.
Stage 2	Obtain site-specific data to predict eagle fatality rates and disturbance.	Site-specific surveys to determine eagle exposure rate in project footprint, the location and preconstruction occupancy and productivity of potentially-affected eagle nests, and the location of eagle migration corridors and stopover sites, foraging concentration areas, or communal roosts in the project area.	Program—*2.2 Avian Use* Project—*4.0 Risk Assessment*
Stage 3	Conduct turbine-based risk assessment and estimate the fatality rate of eagles for the facility evaluated in Stage 2, excluding possible advanced conservation practices (ACPs).	Assess risk factors for each turbine, such as nearby cliff rim, migration pass, or prey concentration. Use results of this risk factor assessment along with an estimate of eagle exposure rate derived from Stage 2 data in Service-provided models to predict the annual eagle fatality rate for the project.	Program—*3.0 Impact Assessment* Project—*4.4 Preconstruction Fatality Estimate, CM-1: Site Turbines to Avoid High-Risk Landscape Features*
Stage 4	Identify and evaluate ACPs that might avoid or minimize fatalities identified in Stage 3. When required to do so, identify compensatory mitigation necessary to reduce any remaining fatality effect to a no-net-loss standard.	Re-run fatality prediction models with risk adjusted to reflect application of ACPs. Calculate required compensatory mitigation amount and identify the method to accomplish it.	Program—*3.0 Impact Assessment* Project—*4.4 Preconstruction Fatality Estimate*, *5.0 Conservation Measures*, *5.2 Compensatory Mitigation*
Stage 5	Document annual eagle fatality rate and disturbance effects. Identify additional ACPs to reduce observed level of mortality, and determine effectiveness of initial ACPs. When appropriate, monitor effectiveness of compensatory mitigation.	Conduct fatality monitoring in project footprint. Monitor occupancy and productivity of nests of eagle pairs that are likely using the project footprint. Monitor eagle use of communal roosts in the project area.	Program—*3.0 Impact Assessment* Project—*6.0 Monitoring and Adaptive Management*

Note: This APP terms advanced conservation practices (ACPs) as conservation measures.

Source: U.S. Fish and Wildlife Service 2011

4.0 Risk Assessment

The project proponent will conduct a risk assessment to characterize the presence and activity of species of concern in the project site and its vicinity in order to inform turbine siting. The risk assessment will be written up in the project-level BCS developed by the project proponent for each repowering project. The risk assessment will include the following components:

1. Project-Level Site Characterization
2. Avian Behavior and Use Survey
3. Golden Eagle Inventory

4.1 Project-Level Site Characterization

2.0 Existing Conditions of this APP provides a program-level assessment of site conditions based on the most current information available. The project proponent will update this information for their proposed project consistent with site suitability assessment according to the measures described below. These measures incorporate recommendations from the Tier 3 approach in the Land-Based Wind Energy Guidelines (U.S. Fish and Wildlife Service 2012) and Eagle Conservation Plan Guidelines (U.S. Fish and Wildlife Service 2011), and inventory and monitoring recommendations in the *Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations* (Pagel et al. 2010), or as updated.

4.2 Avian Behavior and Use Data

Avian use and behavior surveys have been conducted by the ACAFMT since 2005. The protocol has been changed several times since the inception of the program. Use data (i.e., presence of birds) have been collected using modified point counts at approximately 77 point count stations distributed throughout the APWRA. Behavior data is currently being used to develop models of avian collision risk. Information on relative abundance of birds in the APWRA over time has been summarized by the ACAFMT in the context of interpreting changes in fatality rates.

Currently, the ongoing avian fatality-monitoring program collects information on relative abundance at non-repowered sites distributed throughout the APWRA. This information can be used to provide a baseline of avian abundance at specific project sites prior to re-powering, information which can be used to assess potential changes in avian abundance after repowering if avian use data is collected post-construction.

4.3 Golden Eagle Inventory

*[**Note to Reader**: This draft APP provides measures to streamline compliance with BGEPA including a golden eagle inventory as part of the Risk Assessment in accordance with the ECP Guidance (U.S. Fish and Wildlife Service 2011). This type of study has been completed for the APWRA (Hunt and Hunt 2006, Hunt 2002, Hunt et al. 1995) but these data are not sufficient to characterize the current status of the population per Draft ECP Guidance. Hunt and Hunt (2006) recommended that an inventory of the APWRA's golden eagle population be conducted every 5 years. It is the County's understanding that an effort is ongoing to resurvey eagle territories around the APWRA to update previous studies. If the USFWS judges this effort satisfy the recommendations of the Draft ECP Guidance, the fee proposed in the section below may not be necessary. Project proponents are recommended to consult with the USFWS to determine if any additional surveys are necessary.*

Golden eagle abundance is well documented within the APWRA (Hunt 2002; Hunt and Hunt 2006); however, studies of the golden eagle population in the APWRA vicinity are now out of date (Hunt and Hunt 2006). ECP Guidance requires project proponents to conduct a golden eagle inventory by surveying the eagle nesting population (eagle territories), concentration areas (communal roosts and foraging concentrations), and migration stopovers within a distance of the project site equal to the average inter-nest distance within the APWRA at the time of the survey (U.S. Fish and Wildlife Service 2011). Surveying eagle territories within the average APWRA inter-nest distance of the project site will allow the permitting agencies to determine the number of breeding and juvenile eagles likely to be affected by the proposed project and to better understand potential population-level effects of repowering the Project Area. Therefore, all proponents will pay a one-time fee of $X,XXX to fund a comprehensive study of golden eagle population in the APWRA vicinity.

The project proponent will also evaluate the available fatality and avian use data to identify high-risk areas for golden eagles. Risk factors that contribute to eagle collisions will be discussed and quantified based on available information. There are numerous factors that contribute to collision risk. Fatality data at a project site (prior to repowering) is often the best index of collision risk, especially if used in conjunction with relative abundance. However, to assess collision risk for a proposed repowering site, other factors such as proximity to nest and roost sites, turbine height, type, rotor speed, perch availability, rotor-swept area, topography, wind speed, and the interaction of flight behavior with topographic features should also be considered. The project proponent will evaluate site-specific risk factors for turbine collision to inform micro-siting of turbines (see *CM-1: Site Turbines to Minimize Potential Impacts*).

The golden eagle inventory and behavior analysis provides context for eagle effects and application of conservation measures. Risk-factor documentation will inform micro-siting of turbines. The analysis of existing use and behavior data will help identify the most frequently used areas by eagles so that the project proponent can avoid siting turbines in these areas.

4.4 Preconstruction Fatality Estimates

Pre-construction fatality estimates at the project-level are helpful in characterizing the expected loss of bird species. These estimates also define a threshold against which post-construction fatality estimates will be evaluated to determine if impacts are in line with pre-construction predictions and thus if adaptive management actions are necessary to mitigate unforeseen adverse impacts to bird species.

Each project proponent will estimate fatalities for each focal species as part of the project-specific BCS. The fatality estimates will be based on the approach described in this section and in coordination with the TAC. The project proponent will utilize best available data at the time of BCS development by compiling the most applicable post-construction fatality and use monitoring data from repowered projects in the APWRA. The project proponent will assess comparable bird use and fatality rates at existing repowered turbines and note any additional conservation measures and compensatory mitigation at the proposed project, in addition to those at existing repowered projects from which fatality data are compiled, that may further reduce avian mortality. (Currently only Diablo Winds and Buena Vista repowering projects have post-repowering monitoring data but the Vasco Winds repowering project is expected to have data beginning in late 2012 and Tres Vaqueros repowering project the following year. As more monitoring at repowering projects continues to generate more data, subsequent projects can use these data to provide better-informed pre-construction fatality estimates.) If comparable use and fatality data from existing repowered turbines does not exist, then the proponent will perform a collision risk assessment to estimate fatalities by using appropriate avian use and exposure data for the project site. Project proponents will determine per MW and project-wide annual fatality estimates for each of the eight focal species, for all raptors combined, and for all other bird species combined. The County will approve of pre-construction fatality estimates prior to construction.

The TAC will also compare preconstruction fatality estimates to those presented in Table 5. If per MW fatality estimates are predicted to exceed those in Table 5, the TAC may recommend to the County that Tier 1 AMMs to be implemented by the project proponent to appropriately address the risk. Other measures not contemplated by this APP that would reduce the level of risk may also be developed in coordination with the TAC.

5.0 Conservation Measures

The measures described in this chapter would be implemented to avoid and minimize potential impacts to birds and their habitat, as well as to mitigate impacts where they persist. This section includes measures to be implemented before construction, during construction, and after construction (including decommissioning) and will be based on existing data as summarized above, as well as additional data from newly repowered projects.

The conservation measures are based on guidance from the following documents:

- USFWS-sponsored Wind Turbine Guidelines Advisory Committee, including the *Land-Based Wind Energy Guidelines* (U.S. Fish and Wildlife Service 2012a)
- Draft Eagle Conservation Plan Guidance (U.S. Fish and Wildlife Service 2011)
- Alameda County 2005 CUP as amended in 2007
- 2010 Settlement Agreement between the State of California Attorney General, NextEra, Audubon, and CARE
- 1998 Repowering EIR (County of Alameda Community Development Department 1998)
- Vasco Winds Repowering Project EIR (Contra Costa County Department of Conservation and Development 2011)
- Recommendations of the APWRA SRC
- *California Guidelines for Reducing Impacts to Birds and Bats from Windplant Development* (CEC Guidelines; California Energy Commission and California Department of Fish and Game 2007)
- Other relevant wind-energy planning documents. Additional conservation measures were developed specifically for this APP.

5.1 Avoidance and Minimization

CM-1: Site Turbines to Minimize Potential Impacts

The Land-based Wind Energy Guidelines, Draft Eagle Conservation Plan Guidance, and CEC Guidelines all direct project proponents to conduct landscape-level analyses to identify suitable areas for wind-energy development that avoid and minimize impacts to species of concern. However, these guidelines are largely focused on wind-energy development proposals for sites without existing wind turbines, as opposed to repowering projects as is the case in the APWRA. Because projects implementing this APP are repowering projects, there is considerably less flexibility for general siting. However, micro-siting (analyses based on landscape features and location-specific bird use and behavior data) and project-level preconstruction surveys are believed to be successful at identifying the least risky layout for repower turbines in the APWRA (Smallwood et al. 2009).

The project proponent will use best available science to develop a turbine layout that reduces risk to avian species to the greatest extent feasible. Such data may include monitoring data from previous

APWRA repowering projects; ACAFMT data; field data on behavior, utilization, and distribution patterns; preconstruction geographical and topographical map-based predictive models based on raptor use and behavior studies (e.g., Smallwood and Neher 2010, 2011; Smallwood et al. 2009); and any additional studies published in peer-reviewed scientific journals that are available at the time of project design.

The project proponent will also implement the following actions when siting turbines:

- Use existing roads and transmission corridors to the extent possible while developing site plans.
- Identify, using the best available data including micro-siting analyses that incorporate bird flight behavior, movement pathways (including migration flyways), high-density foraging areas, and known frequent fatality areas and site turbines away from these high-use areas.
- Compile results of the micro-siting analyses for each turbine and document in the project-level APP, along with the specific location of each turbine.
- Site turbines at least 100 yards away from features of the landscape known to attract raptors and migrant birds whenever feasible (e.g., water sources, riparian vegetation).
- Site turbines a minimum of 100 yards from defined canyon edges or "breaks" which routinely serve as flight paths for raptors.
- Site turbines to avoid dips or notches along ridges, particularly in areas where the dip is less than 100 yards across, as well as saddles in between ridges.
- Site turbines 100 yards away from natural rock outcrops whenever feasible.

The County may require additional conservation measures based on best available science and data at the time of project permitting.

CM-2: Use Turbine Designs that Reduce Avian Impacts

Use of turbines with certain characteristics is believed to reduce the collision risk for avian species. Project proponents will implement the following measures:

- The distance of the lowest point of the turbine rotor (i.e., the tip of any blade at the 6:00 position), will be no less than 29 meters (95 feet) from the ground surface. This design characteristic addresses the finding that roughly 74% of all bird observations (54% of raptor observations) occurred at heights less than 30 meters (Curry and Kerlinger 2009).
- Turbine design will limit or eliminate perching opportunities. Designs will include a tubular tower with no perchable surfaces (e.g., no external catwalks, railings, or ladders).
- Turbine design will limit or eliminate nesting or roosting opportunities. Openings on turbines will be covered to prevent cavity-nesting species from nesting in the turbines.
- Install lighting on the fewest number of turbines as allowed by the Federal Aviation Administration (FAA), and all pilot warning lights should fire synchronously.
- Turbine lighting will employ only red, or dual red and white strobe, strobe-like, or flashing lights.
- All lighting on turbines will be operated at the minimum allowable intensity, flashing frequency, and quantity allowed by the FAA (Gehring et al. 2009; U.S. Fish and Wildlife Service 2012a). Duration between flashes shall be the longest allowable by the FAA.

CM-3: Incorporate Avian-Safe Practices into Design of Turbine-Related Infrastructure

Project proponents 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 the FAA. If lighting is required, it will be operated at the minimum allowable intensity, flashing frequency, and quantity allowed by the FAA.
- All new collection lines will be placed underground whenever feasible. All above ground lines will be fitted with bird flight diverters or visibility enhancement devices (e.g., spiral damping devices). Lines may be placed above ground immediately prior to entering the substation.
- When lines cannot be placed underground, appropriate avian protection designs must be employed. As a minimum requirement, the collection system will utilize the most current edition of the Avian Power Line Interaction Committee guidelines to prevent electrocutions.
    - Energized conductors, hardware, and grounded conductors will be placed a minimum of 60 inches apart to ensure adequate separation to avoid electrocution of golden eagles.
    - If adequate separation is not possible, energized parts and/or grounded parts will be covered with wildlife boots or other insulating materials to avoid contact with birds.
    - Install perch and nest deterrents on crossarms and poles.
- 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.

CM-4: Retrofit Existing Infrastructure to Minimize Risk to Raptors

Any existing power lines on the project site associated with electrocution of an eagle or other raptor will be retrofitted within 30 days to make them raptor-safe according to Avian Power Line Interaction Committee guidelines (Avian Power Line Interaction Committee 2006). All other existing structures to remain on the project site during repowering will be retrofitted, as feasible, according to specifications of CM-3 prior to repowered turbine operation.

CM-5: Discourage Prey for Raptors

Project proponents will apply the following measures when designing and siting turbine-related infrastructure. These measures are intended to minimize opportunities for fossorial mammals to become established and thereby create a prey base that could become an attractant for raptors.

Rodenticide will not be utilized due to the risk of raptors scavenging the remains of poisoned animals.

- Boulders (rocks greater than 12 inches in diameter) excavated during project construction may be placed in above-ground piles within the project site so long as they are more than 200 yards (656 feet) from any turbine. Existing rock piles created during construction of first- and second-generation turbines will also be moved at least 200 yards away from turbines.
- Gravel shall be placed at least 3 feet deep and 5 feet wide around each tower foundation to discourage small mammals from burrowing near turbines.
- At the completion of project construction, the project proponent will prepare road edges such that agricultural activities, including grazing, can be conducted immediately adjacent to the road surface. This preparation will entail clearing excess gravel and soil from the shoulder, feathering road edges for runoff control, and replacing topsoil to support native revegetation. In areas where topography precludes this approach, the road edges will be smoothed and compacted.

CM-6: Minimize Potential Nest Disturbance During Construction, Operation, and Decommissioning

As described in Section 1.3.1.2 Migratory Bird Treaty Act and Section 1.3.1.5 California Fish and Game Code, all birds and bird nests are protected by federal and state regulations. The following CMs will be implemented during construction to avoid disturbance of active nests:

- The area and intensity of disturbance will be minimized to the extent possible during construction and decommissioning.
- Existing roads will be used for access during construction, operation, and decommissioning to the extent possible.
- A transportation plan will be implemented during construction, operation, and decommissioning that includes road design, locations, and speed limits to minimize habitat fragmentation, wildlife collisions, and noise effects.
- A qualified biologist will conduct preconstruction surveys of all potential avian nesting habitat within 0.25 mile of construction areas no more than 30 days prior to construction (any groundbreaking activities as well as establishment of staging and laydown areas).
- As a minimum, a qualified biologist will conduct burrowing owl surveys in accordance with guidelines set forth in CDFW's *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012), which specifies preconstruction surveys and standard measures to avoid or relocate owls as well as guidance for compensatory mitigation for loss of habitat, or based on other CDFW guidance current at the time of construction. A qualified biologist will also conduct preconstruction surveys for other ground-nesting birds covered by the MBTA.
- If nesting raptors are identified in areas susceptible to disturbance from construction or decommissioning activities, the project proponent will establish a no-disturbance buffer zone. The size of the zone will be determined in consultation with relevant jurisdictional agencies (e.g., CDFW). Factors to be considered include intervening topography, roads, development, type of work, visual screening, and nearby noise sources. Buffers will not apply to construction-related traffic using existing roads that are not limited to project-specific use (e.g., county roads, highways, farm roads). If no nests are observed during the preconstruction survey, but nesting

occurs following the start of construction, it will be assumed that the individuals are acclimated to the level of ongoing disturbance.

CM-7: Provide Training for Project Personnel

A qualified biologist will conduct a preconstruction education session at the project site prior to construction or decommissioning activities. Specific information will focus on the distribution, general behavior, and ecology of special-status species that could occur at the project; the protection afforded to such species by the MBTA, BGEPA, ESA, and CESA; the procedures for reporting interactions with listed and proposed species; and the importance of following all the conservation measures. The education session will include discussion and overview of the general constraints associated with biological resources in the project site and the timing and processes required for project implementation. Construction staff will be informed that they are not authorized to handle or otherwise move any special-status species that they may encounter. Onsite staff will participate in the education program prior to engaging in fieldwork. The project proponent will maintain appropriate records to ensure that employees have attended the education program prior to working at the project site.

5.2 Compensatory Mitigation

*[**Note to Reader:** The mitigation options presented below are taken from USFWS guidance documents and other California APPs, BCSs, or ECPs. We have considered but not yet formulated a good approach for incorporating mitigation along the lines of what NextEra worked out in their AG agreement. Retrofitting high-risk electrical poles is the only eagle compensatory mitigation measure for which the USFWS provides detailed draft guidance, describing a quantitative example methodology to offset take of eagles (USFWS 2012b). CM-8 below follows this USFWS example. Further analysis, employing local golden eagle population parameters, if available (e.g., Hunt and Hunt 2006) may be incorporated into the methodology provided by the USFWS to make compensatory mitigation requirements more site-specific to the Project Area. According to the most recent draft technical guidance (USFWS 2012b), mitigating for the loss of every golden eagle (via retrofitting power poles) may cost companies approximately five times more than what NextEra agreed to in their AG agreement, based on the USFWS's cost estimate (average $7,500 per pole) and the 30 retrofits required to compensate for each fatality. However, the costs of retrofitting is highly variable and proponents may be able to substantially lower costs through direct contracts with utilities. These contracts between proponents and utilities would be documented and reviewed by the TAC.]*

CM-8: Mitigate for Loss of Individual Golden Eagles by Contributing Funds to Retrofit Offsite Electrical Facilities to Raptor-Safe Standards

In order to comply with CEQA as it applies to the local golden eagle population in the APWRA (see *1.3.1.4 California Environmental Quality Act*) and to streamline adherence to the *Draft Bald and Golden Eagle Protection Act Standards for Review of Wind Energy Projects* (U.S. Fish and Wildlife Service 2010) and the Draft ECP Guidance, the project proponent will retrofit high risk power poles to mitigate for every eagle fatality estimated by the project-level post-construction monitoring. The U.S. Fish and Wildlife Service's Resource Equivalency Analysis template (2012b) estimates 30 power pole retrofits are required to compensate for the lost productivity of an eagle fatality. At the estimated cost of $7,500 per pole (U.S. Fish and Wildlife Service 2012b), the project proponent may contribute $225,000 to a third party mitigation account for each estimated eagle fatality, or contract the retrofits directly with appropriate utility owners/operators in order to potentially reduce costs. Total costs may be reduced by reducing the cost per pole retrofit, or, if approved by the County in consultation with the TAC, documentation of the need for fewer power pole retrofits to compensate per eagle fatality. If contracting directly, the project proponent will consult with utility companies to ensure that high-risk poles have been identified for retrofitting. Proponents will agree in writing to pay utility owner/operator to retrofit the required number of power poles and maintain the retrofits for 10 years[10]. Should post-construction monitoring stop, the proponent will retrofit annually a number of poles according to the average eagle fatalities determined over the course of post-construction monitoring. The number of retrofits may be reduced with ongoing retrofit maintenance over the life of the project or if subsequent monitoring indicates fewer golden eagle fatalities upon approval from the County in coordination with the TAC.

CM-9: Mitigate for Loss of Individual Raptors by Contributing to the California Raptor Center

The California Raptor Center (Center) is affiliated with the UC Davis School of Veterinary Medicine. The Center's programs focus on raptor education, raptor health care and rehabilitation, and raptor research. The Center receives more than 200 injured or ill raptors annually. Approximately 60 to 65 percent are rehabilitated and returned to the wild. In a typical year, the four raptor species most commonly brought in for care are barn owl (96 admissions in 2006), American kestrel (20 admissions), red-tailed hawk (19 admissions), and Swainson's hawk (15 admissions; California Raptor Center 2011). The Center relies on donations of time and resources to provide resident raptor care and feeding, underwrite education programs, provide rehabilitation medical supplies and medication, and maintain the Center and facilities.

Project proponents may offset raptor fatalities by contributing $580 (the average cost to rehabilitate one raptor; B. Stedman pers. comm.) per estimated raptor fatality to the Center each year. A portion of the total predicted raptor fatalities may be contributed, in concert with other compensatory mitigation to be approved by the County in consultation with the TAC.

[10] The USFWS uses a period of 10 years for crediting a project proponent for the avoided loss of eagles from power pole retrofits. However, project developers or operators should consider entering into agreements with utility companies or contractors for the long-term maintenance of retrofits. Evidence of this type of agreement could increase the amount of credit received by the project developer or operator and, as a result, decrease the amount of compensatory mitigation required (U.S. Fish and Wildlife Service 2012b).

6.0 Monitoring and Adaptive Management

6.1 Post-Construction Monitoring

*[**Note to Reader:** The goals of the APP fatality monitoring program are to 1) establish a consistent monitoring protocol for proponents that will provide accurate and comparable data across projects 2) determine if post-construction impacts are in line with pre-construction estimates of impacts to avian resources; and 3) to ensure that data and fatality estimates are comparable to data collected at old-generation turbines by the Alameda County Avian Fatality Monitoring Program.]*

ICF has supplied a "straw man" of a proposed monitoring protocol based on concerning biases inherent in the various estimators of fatality rates and total fatalities and development of new estimators and measures of variance. Biases in the estimators have implications for how both carcass surveys and detection probability trials are conducted. The proposed protocol outlined below is designed to address the issues currently being raised and provide the basis for a discussion with experts and agency personnel so that refinements can be made and the trade-offs between objectives and costs can be evaluated in a collaborative process.

Project proponents will estimate fatality rates and total fatalities by implementing the fatality monitoring protocol proposed in this APP. Proponents will estimate both fatalities per MW per year and fatalities per turbine per year for all focal species, all raptors, and all native birds. Estimated fatality rates and total fatalities will be compared to pre-project fatality rate and total fatality estimates (see *4.4 Preconstruction Fatality Estimates*), and to fatality rates from older generation turbines estimated by the ACAFMT.

6.1.1 Monitoring Requirements

Project proponents will use the results of post-construction monitoring to validate the preconstruction risk assessment and inform adaptive management, if necessary, by addressing the following uncertainties.

- The number of birds of each species killed annually
- Which power structure (e.g., wind turbines or meteorological towers) is responsible
- How post-construction fatality rates compare to pre-repowering fatality estimates in general and for each of the focal species
- Whether unusually high fatality rates are associated with particular structures
- Whether new species not previously considered to be high risk are now at greater risk from repowered turbine operation
- Any patterns in fatality data that could lead to more effective design (e.g., turbine siting) and mitigation measures at repowering projects in the future

Post-construction monitoring procedures will include documentation of compliance with the above permitting requirements.

6.1.2 Monitoring Protocols

Post-construction monitoring will be conducted for 3 years at the project site beginning within 3 months of the commercial operation date (COD). Monitoring may continue beyond 3 years if construction is completed in phases or if results of fatality monitoring and/or adaptive management measures warrant the collection of additional data (see *6.2 Adaptive Management*). Monitoring will be conducted for two additional 2-year periods, beginning at the 10th and 20th anniversary of the initial COD, assuming a 30-year operating life of the project. Project proponents will also agree to provide access to qualified third parties to conduct any additional monitoring after the initial 3-year monitoring period has expired and before and after the additional 2-year monitoring periods, provided that such additional monitoring utilizes scientifically valid monitoring protocols that yield results that are reasonably comparable to other efforts to monitor repowered turbines in the Project Area.

There are three major field components of the monitoring protocol for projects subject to this APP.

1. Avian use surveys to determine the seasonal and annual variations in relative abundance and species use patterns.
2. Carcass surveys to estimate fatality rates and total number of fatalities.
3. Detection probability surveys (to account for changes and differences in detection probability between locations, seasons, years, surveys crews, etc., that have historically involved separate trials to estimate scavenger removal and searcher efficiency rates).

6.1.2.1 Avian Use Surveys

Post-construction monitoring will include avian use surveys in the project site to estimate relative abundance and use of the project site. Information describing the relative abundance of raptor species at the project site is crucial to interpreting changes in estimates of avian fatality rates and total fatalities over time and to guide adaptive management of the facility. Observation points will be established based on topography, visibility, and the distribution of habitats and habitat features across the project area. The objective is to sample enough observation points to provide sample coverage of all habitats and habitat elements in the project area, in accordance with the CEC Guidelines (California Energy Commission and California Department of Fish and Game 2007). The number of observation points required to meet the objective will be determined in coordination with the TAC.

Surveys will consist of one 30-minute session at each observation point once per week for a minimum of 3 years. The maximum search radius will be 600 meters. A qualified observer will record the number of individuals of each species, noting behavior, location, and other attributes as time allows. Observers will also make note of raptor prey species detected during the observation period. The order in which observation points are surveyed will be selected to ensure no systematic bias in the distribution of daylight hours surveyed or each observation point.

6.1.2.2 Carcass Surveys

Number of Turbines Monitored and Search Interval

The CEC Guidelines suggest searching 30% of the turbines within a project site in most cases (California Energy Commission and California Department of Fish and Game 2007). In the case of projects with fewer turbines, the 30% criterion may not be appropriate; the USFWS (2012) recommends that all turbines be searched if there are fewer than 10 turbines.

The CEC Guidelines (California Energy Commission and California Department of Fish and Game 2007) also recommend a search interval of approximately 14 days. The recent 2010 Settlement Agreement between the State Attorney General and NextEra (Settlement Agreement 2010) requires a 30-day search for all repowered turbines and a twice-per-month search interval for 30% of repowered turbines.

Projects subject to this APP will survey all repowered turbines to ensure that golden eagle fatalities are documented to the maximum extent practicable. However, the search interval may be extended to a maximum of 45 days at a subset of turbines to reduce the cost of covering all turbines each year. This will achieves the objective for golden eagles because the carcass removal rate for golden eagles is low and searcher efficiency (the probability of detecting a carcass given that it is still in the search plot at the time of the search) is high. The remaining turbines should be searched at an interval of 7 to 14 days, or a combination of some turbines being searched at 7 and some at 14-day intervals, depending on the size of the project and the species determined to be at greatest risk during the pre-construction assessment. During the first 3 years of monitoring, the individual turbines searched at the various intervals should be rotated so that coverage of each turbine is distributed roughly equally, unless the TAX concurs that there are compelling reasons to allocated search effort disproportionately.

Searches

The CEC Guidelines (California Energy Commission and California Department of Fish and Game 2007) recommend that the width of the search area should equal the maximum rotor tip height (i.e., the height of the blade tip when positioned at 12 o'clock), to be specified in the project-specific monitoring plan.

Clean sweep surveys will be conducted to remove any carcasses from the search plots that have accumulated prior to the onset of fatality monitoring and at any turbine that has a lapse in search effort of more than 60 days. Surveyors will walk transects regularly spaced a maximum of 10 meters apart from the base of the turbine out to the total search radius distance using a belt-transect technique, visually searching the ground for any evidence of a fatality out to 5 meters on either side. Transect spacing should be adjusted to accommodate reduced visibility due to topography, grass height or other factors limiting visibility. Searchers will verify the accuracy of their transect spacing through periodic confirmation with a rangefinder or a GPS unit with sub-meter accuracy in combination with aerial photographs with the search plot overlaid.

The order in which turbines are searched on a given day will be scheduled to ensure that each turbine is searched at varying times of day throughout each season to avoid time-of-day biases.

Fatalities

Fatalities comprise partial or intact carcasses and collections of feathers that meet the diagnostic criteria of a fatality. To be considered a fatality, each find must include body parts and/or feathers. In the case of feathers, at least five tail feathers, two primaries from the same wing within 5 meters of each other, or a total of 10 feathers must be found. Whenever partial remains are found, the data must be cross-referenced with finds from previous searches and adjacent turbines to avoid double-counting. Data will be collected describing the condition and location of the find, and the identity of the nearest structure will be recorded. Locations will be documented using global positioning system (GPS) units. Photographs will be taken of the carcass as it was found and to indicate its location relative to nearby turbines or other structures. All carcass remnants will be collected and placed in sealable plastic bags (e.g., Ziploc) and frozen for future use during detection probability surveys, release to USFWS, research use, or donation to the USFWS National Eagle Repository, as appropriate.

Any avian carcasses found on site incidentally by surveyors or onsite staff will be recorded as incidental finds and handled in the same manner as the regular search carcasses. Injured birds will be reported as fatalities. All bird deaths will be reported to the project's Wildlife Response and Reporting System[11] database.

Each time an area is searched, data will be recorded regarding weather conditions; groundcover classification by height and type; turbine functionality (e.g., whether it is operational or shut down for maintenance); search area access issues; and presence of raptor prey species.

6.1.2.3 Detection Probability Surveys

The number of fatalities detected during the carcass surveys is not equal to the actual number of fatalities at a turbine or project. Carcasses can be missed by surveyors (searcher efficiency) or can be removed from the search area during the interval between deposition and the survey (carcass removal), resulting in an underestimate of fatalities. Detection probability estimates are used to correct raw counts and thus provide an accurate estimate of total fatalities. Detection probability surveys will be implemented using the integrated detection probability protocol described below.

Integrated Detection Probability Trial Protocol

*[**Note to Reader**: This is new information that has not yet been widely adopted and for which there are no firm results from actual fatality studies at operational wind farms. Also, the availability of carcasses for use in trials may be limiting if multiple projects become operational at the same time. Therefore, specific aspects of this protocol should be reviewed with other experts and the wildlife agencies so that appropriate and necessary modifications can be made if necessary.*

Detection probability trials should be conducted once per season using 20 birds—10 small birds and 10 medium to large birds. Carcasses will be placed across the project site at randomly selected bearings and distances from turbines within the search area, and stratified by land cover type and visibility category. Each carcass will be marked with green electrical tape on one leg to distinguish it from actual turbine fatalities. Upon placement in the field, the carcasses will be checked daily for 7 days, every 2 days through day 14, and then weekly for a duration of three times the maximum

[11] The Wildlife Response and Reporting System (WRRS) is a specific set of processes, procedures and training for monitoring, responding to, and reporting bird or bat injuries and fatalities specific to each project proponent.

search interval (exclusive of the 45 day interval that may be used at a subset of turbines for the purpose of documenting all golden eagle fatalities described above).

During each check, the carcass will be classified into one of the following categories:

- Intact (whole, unscavenged).
- Scavenged (signs of scavenging present, dismemberment, or feather spot remaining).
- Feather spot (the carcass was scavenged and mostly removed, but more than 10 feathers remained).
- Removed (not enough remains of carcass to be considered a fatality, hereby defined as at least five tail feathers or two primaries within at least 5 meters of each other, or a total of 10 feathers in standardized carcass search).

Searchers should be blind to the presence and timing of detection probability trials until the carcass is detected or removed (or the trial ends at 3 times the maximum search interval).

6.1.3 Fatality Estimates

The project proponent will calculate estimates of fatality rates and total fatalities using the newly developed partially periodic estimator (Warren-Hicks et al. 2012). As additional, more refined estimators become available, they can be used to provide a more accurate estimate of fatalities, but the Warren-Hicks et al. (2012) estimator should be reported in all cases to facilitate comparison among projects.

6.1.4 Reporting, Collaboration, and Information Sharing

The project proponent or its contractor will prepare an annual report documenting the results of each year's monitoring efforts. The report will be submitted to the TAC and the California Public Utilities Commission (CPUC) within 90 days of the end of each complete year of monitoring. If additional monitoring is conducted outside of the monitoring prescribed in this program, the reporting schedule will be determined in coordination with the TAC.

As part of the reporting process, all mortalities will be reported to the USFWS Law Enforcement Branch Bird Injury and Mortality Reporting System database and all eagle injuries or fatalities will be reported to USFWS, BLM, and CDFW within 24 hours of discovery for their direction on collection and/or sending carcasses to the national eagle repository. The project proponent will also report incidental discoveries of injured or dead golden eagles for the life of the project.

The project-specific avian protection plan will include a list of primary contacts for agency personnel at USFWS, CDFW, and the County.

6.1.5 Data Application

Results will be used by the project proponent, the County, USFWS, CDFW, and the CPUC to determine the effectiveness of mitigation measures, and to determine which, if any, turbines produce a disproportionately high number of fatalities. The results will validate turbine micro-siting and inform the appropriateness of mitigation measures implemented by the project proponent for the benefit of future wind-energy projects.

6.1.6 Monitoring Permitting Requirements

A Special Purpose Permit under 50 CFR 21.27 (special use permit) is required prior to implementing activities that may affect migratory birds, their parts, nests, or eggs. Such a permit is required before any person may lawfully take, salvage, or otherwise acquire, transport, or possess migratory birds, their parts, nests, or eggs for any purpose. The project proponent, its contractors, or the County will obtain a special use permit to perform the monitoring requirements described above.

6.2 Adaptive Management

The body of knowledge for the interaction of wind-energy generation with birds is continually growing. Accordingly, pursuing an adaptive management strategy to adjust operation and mitigation to the results of monitoring, new technology, and new behavioral information is crucial to ensuring that impacts are minimized to the greatest extent feasible. The AMMs presented in Sections 6.2.1 to 6.2.3 are suggestions based upon current knowledge and practices to reduce or mitigate impacts from turbine-related fatalities to bird species. Other AMMs that more appropriately address project-specific impacts may be required by the County in consultation with the TAC.

Prior to construction the TAC will compare project-specific preconstruction fatality estimates from project-level environmental compliance documents (see *4.4 Preconstruction Fatality Estimates*) to the fatality rate thresholds in Table 4. If per MW fatality estimates are predicted to exceed those in Table 5, the TAC may recommend to the County that Tier 1 AMMs be implemented by the project proponent to appropriately address the risk. Other measures not contemplated by this APP that would reduce the level of risk may also be developed in coordination with the TAC.

The TAC will also review results of project-specific monitoring reports prepared by each project proponent. Should fatality estimates resulting from post-construction monitoring exceed preconstruction fatality estimates, the County, in consultation with the TAC, may require project proponents to implement AMMs outlined in the following sections according to Tiers 1, 2, and 3. Project proponents will conduct fatality monitoring for at least 2 years subsequent to implementation of any adaptive management measures in order to ensure that measures effectively reduce fatality rates below preconstruction estimate levels. Note that additional adaptive management thresholds may be established outside of this APP between project proponents and the USFWS if project proponents apply for an eagle take permit (74 FR 46836, 2009).

Table 5. Fatality Thresholds for Tier 1 Adaptive Management Measures Based on Project-Specific Preconstruction Fatality Estimates

Species	Fatalities/MW (95% CI)
American Kestrel	0.54 (0.37-0.71)
Barn Owl	0.26 (0.21-0.31)
Burrowing Owl	0.79 (0.53-1.05)
Golden Eagle	0.09 (0.08-0.10)
Loggerhead Shrike	0.16 (0.07-0.25)
Prairie Falcon	0.00 (0.00-0.00)
Red-tailed Hawk	0.52 (0.43-0.61)
Swainson's Hawk	0.00 (0.00-0.00)
All raptors	2.30 (1.70-2.90)
All native non-raptors	3.57 (1.94-5.20)

CI 95 percent confidence interval

Exceeding the preconstruction fatality estimates, to be considered baseline fatality thresholds in the adaptive management framework context, will require implementation of AMMs according to the following tiers:

- Tier One is defined as preconstruction fatality estimates of focal species, all raptors, or all other birds combined exceeding the amounts established in Table 5, or post-construction fatality estimates of focal species, all raptors, or all other birds combined exceeding preconstruction baseline estimates for 1 year.
- Tier Two is defined as fatality of focal species, all raptors, or all other birds combined exceeding preconstruction baseline estimates for 2 consecutive years.
- Tier Three is defined as fatality of focal species, all raptors, or all other birds combined exceeding preconstruction baseline estimates for 3 consecutive years.

6.2.1 Tier One Adaptive Management Measures

- **Visual Modifications.** If Tier One is exceeded then the project proponent will paint 25 percent of the turbine blades in a pattern to be determined by the County in consultation with the TAC. USFWS recommends testing measures to reduce *motion smear*—the blurring of turbine blades due to rapid rotation that renders them less visible and hence more perilous to birds in flight. Suggested techniques include painting blades with staggered stripes or painting one blade black. The project proponent shall conduct fatality studies on a controlled number of painted and non-painted turbines. The project proponent will coordinate with the TAC to determine the location of the painted turbines, but the intent is to install in areas that might have a higher potential for avian impacts.
- **Electric Pole Retrofit:** The proponent will pay to retrofit 11 utility poles every year for each focal species exceeding the baseline fatality thresholds determined by preconstruction estimates.

6.2.2 Tier Two Adaptive Management Measures

In addition to implementing Tier One AMMs, the proponent will implement the following:

- **Anti-perching Measures:** Anti-perching devices will be installed on all man-made structures within 1 mile of project facilities (with landowner permission) to discourage bird use of the area.
- **Contribution to Research:** The project proponent will contribute $2,000 for each fatality exceeding thresholds (Table 4) in support of research of new technologies to help reduce turbine-related fatalities. Similarly, the project proponent could deploy experimental technologies at a comparable cost (if appropriate innovations become available) at its facilities to test their efficacy in reducing turbine-related fatalities through before-after-control-impact (BACI) methods. Research could also investigate bird-turbine interactions, including population-level effects. The last golden eagle inventory of the APWRA vicinity was conducted in 2005 (Hunt and Hunt 2006). The researchers suggested that an inventory of the APWRA golden eagle population be conducted every 5 years to track population trends and the impacts of turbine-related fatalities in the APWRA.

6.2.3 Tier Three Adaptive Management Measures

In addition to implementing Tier One and Two AMMs, the proponent will implement the following:

- **Turbine Curtailment:** If the post-construction monitoring indicates patterns of turbine-caused fatalities, such as time of day, avian usage, topographic circumstances of the turbine location, or other data which would substantiate that a specific curtailment of a turbine's operation would result in reducing future avian fatalities, the project operator would curtail the offending turbine or turbines. Curtailment restrictions would be developed in coordination with the TAC and based on current avian use data at the project site.
- **Cut-in Speed Study:** A statistically valid (e.g., BACI) 6 month cut-in-speed study will be conducted to see if changing cut-in speeds from 3 meters per second to 5 meters per second will significantly reduce avian fatalities. The proponent will coordinate with the TAC in designing the study. Should increasing the cut-in speed be shown to have positive results but bird fatalities continue, cut-in speed restrictions will be implemented.
- **Real-time Turbine Curtailment (only if threshold for raptors is exceeded):** This monitoring approach involves a multiple step process based on radar, video, and visual observations to employ real-time turbine curtailment. In effect, an onsite biologist will monitor raptors from a control room in an observation tower with a 360-degree view in the project site. The biologist will make observations during daylight hours, initially locating and tracking raptors by way of radar technology, then identifying and observing flight direction of the raptors using video cameras and binoculars. Once visually located, the biologist will use video tracking software to maintain a lock on the raptor until it has moved away from the site and is no longer in view. If the target is projected to intersect a turbine string, the biologist will provide a curtailment command to the operations center for the appropriate turbines.

7.0 Summary

Each project proponent will formulate a project-specific BCS based upon the framework provided in this program APP. The siting, design, and construction measures are expected to help avoid direct effects during construction and long-term operations. Operations monitoring will determine the magnitude of the actual effects on birds. Offsite mitigation will compensate for the take of focal species, including golden eagles. The adaptive management program will help to ensure that the project operates within the impact levels anticipated and will provide a framework for additional management actions should such actions prove necessary. With implementation of these measures—particularly the offsite mitigation—mortality of avian species in the APWRA would be avoided, minimized, and mitigated to the extent feasible.

8.0 References

8.1 Literature Cited

Altamont Pass Wind Resource Area Scientific Review Committee. 2011. *Agreements & Recommendations.* Updated August 26, 2011. Available: <http://www.altamontsrc.org/alt_doc/p13_src_agreements_compiled_8_26_11.pdf>. Accessed October 31, 2011.

Anderson, R. L., J. L. Dinsdale, and R. Schlorff. 2007. *California Swainson's Hawk Inventory: 2005–2007.* Final Report. Department of Fish and Game Resource Assessment Program, California Department of Fish and Game. Sacramento, CA, U.S.A.

Audubon California. 2010. "Barn Owl named Audubon California's 2010 Bird of the Year: Huge write-in effort lands wins it for popular owl species." *YubaNet.com*. December 14, 2010. Available: <http://yubanet.com/california/Barn-Owl-named-Audubon-California-s-2010-Bird-of-the-Year.php>. Accessed December 3, 2012.

Audubon Society. 2007. *The 2007 Audubon WatchList.* Available: <http://birds.audubon.org/2007-audubon-watchlist>. Accessed: November 9, 2011.

Avian Power Line Interaction Committee. 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the art in 2006.* Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C. and Sacramento, CA.

Babcock, K. W. 1995. Home range and habitat use of breeding Swainson's hawks in the Sacramento Valley of California. *Journal of Raptor Research* 29(3):193–197.

Barclay, J. H. and L. M. Harman. 2008. Burrowing owl abundance in two areas in the Altamont Pass Wind Resource Area in northern California. Unpublished data. Albion Environmental, Inc. 1414 Soquel Avenue, No. 205. Santa Cruz, CA 95062.

Barn Owl Box Company. 2009. "Barn Owls by US States." Available: <http://www.barnowlbox.com/us-barn-owl.html#california_barn_owls>. Accessed December 3, 2012.

Beauvais, G., J. H. Enderson, and A. J. Magro. 1992. Home range, habitat use and behavior of Prairie Falcons wintering in east-central Colorado. *J. Raptor Res.* 26:13-18.

Bird, D. M., and R. S. Palmer. 1988. American Kestrel. Pp. 253–290 in *Handbook of North American Birds.* Vol. 5: diurnal raptors. Part 2 (R. S. Palmer, ed.). New Haven, CT: Yale Univ. Press.

Bloom, P. H. 1980. *The status of the Swainson's hawk in California.* Prepared for The Resources Agency: Department of Fish and Game and United States Department of the Interior, Bureau of Land Management. 22 pp.

Brown, J. M. 1969. Territorial Behavior and Population Regulation in Birds: A Review and Re-evaluation. *Wilson Bulletin* 81:283–329.

Bruce, A. M., R. J. Anderson, and G. T. Allen. 1982. Golden Eagles in Washington. *Raptor Research* 16:132–33.

Bunn, D. S., A. B. Warburton, and R. D. S. Wilson. 1982. *The barn owl*. Vermillion, SD: Buteo Books.

Bunnell, S. T., C. M. White, D. Paul, and S. D. Bunnell. 1997. Stick nests on a building and transmission towers used for nesting by large falcons in Utah. *Great Basin Nat.* 57:263-267.

California Department of Fish and Game. 1993. Los Vaqueros Project-Fish and Wildlife Impacts. A Status Report. 264 pages.

California Department of Fish and Game. 2012. *Staff Report on Burrowing Owl Mitigation.* March, 7.

California Energy Commission. 1989. Avian Mortality at Large Wind Energy Facilities in California: Identification of a Problem. Staff Report P700-899-001. Sacramento, CA.

California Energy Commission and California Department of Fish and Game. 2007. *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development.* Commission Final Report. California Energy Commission, Renewables Committee, and Energy Facilities Siting Division, and California Department of Fish and Game, Resources Management and Policy Division. CEC-700-2007-008-CMF.

CDFG (California Department of Fish and Game). 2011. RareFind, Version 4. Sacramento, California: California Natural Diversity Database. Available: <http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp>. Accessed: October 2011.

California Raptor Center. 2011. *Admissions Statistics.* Available: <http://www.vetmed.ucdavis.edu/calraptor/rescue_rehabilitation/admissions_stats.cfm>. Accessed: November 9, 2011.

Camp, J. L. 2006. Active burrowing owl burrows in the Altamont Pass Wind Resource Area. 2005–2006; unpublished data. Elverta, CA: Western Ecosystems Technology, Inc.

Contra Costa County Department of Conservation and Development. 2010. *Vasco Winds Repowering Project Draft Environmental Impact Report.* SCH No. 2010032094. County File No. LP08-2049. December.

Contra Costa County Department of Conservation and Development. 2011. *Tres Vaqueros Windfarm Project Draft Environmental Impact Report.* SCH No. 2009032077. County File no. LP09-2005. December.

Coulombe, H. N. 1971. Behavior and population ecology of the burrowing owl, Speotyto cunicularia, in the Imperial Valley of California. *Condor* 73:162-176.

County of Alameda Board of Supervisors. 2005. Resolution Number R-2005-453. September 22, 2005. Amended: 2007. Resolution denying in part and granting in part the appeal of Jeff Miller for the Center for Biological Diversity (CBD) and Michael Boyd for Californians for Renewable Energy, Inc. (CARE), of the East County Board of Zoning Adjustments decision on November 13, 2003 to conditionally approve 14 Conditional Use Permits for the maintenance and continued operations of existing wind turbines in the Altamont Pass Wind Resources Area (APWRA) of Alameda County. Oakland, CA. Available: <http://www.altamontsrc.org/alt_doc/alt_permit/board_resolution.pdf>. Accessed: November 11, 2011.

County of Alameda Community Development Agency. 2000. *East County Area Plan.* Revised November 2000. Hayward, CA.

County of Alameda Community Development Department. 1998. *Repowering a Portion of the Altamont Pass Wind Resource Area Draft Environmental Impact Statement.* (SCH #98022024.) August 1998. Hayward, CA.

Craig, R. B. 1978. An analysis of the predatory behavior of the Loggerhead Shrike. *Auk* 95:221–234.

Cull, R. L. and F. Hall. 2007. Status of burrowing owls in northeastern California. Pages 42-51 in Barclay, J. H., K. W. Hunting, J. L. Lincer, J. Linthicum, and T. A. Roberts (Eds.). *Proceedings of the California Burrowing Owl Symposium, November 2003.* Bird Populations Monographs No. 1. The Institute for Bird Populations and Albion Environmental, Inc. Point Reyes Station, CA, vii + 197 pp.

Curry and Kerlinger, LLC. 2009. Avian Monitoring Study and Risk Assessment for the Shiloh III Wind Power Project, Solano County, California. December. McLean, VA. Prepared for enXco, Inc., Tracy, CA.

DeSante, D. F., E. D. Ruhlen, and R. Scalf. 2007. The distribution and relative abundance of burrowing owls in California during 1991-1993: Evidence for a declining population and thoughts on its conservation. Pages 1-41 in Barclay, J. H., K. W. Hunting, J. L. Lincer, J. Linthicum, and T. A. Roberts (eds.). *Proceedings of the California Burrowing Owl Symposium, November 2003.* Bird Populations Monographs No. 1. The Institute for Bird Populations and Albion Environmental, Inc. Point Reyes Station, CA, vii + 197 pp.

DiDonato, J. 1987. University of California Predatory Bird Research Group. Unpublished data.

EPRPD. 2000. Vasco Caves Regional Preserve Resource Management Plan. Prepared by East Bay Regional Parks District Planning / Stewardship Department in Cooperation with Contra Costa Water District. Oakland, CA.

EBRPD. 2002. Brushy Peak Regional Preserve Land Use Plan. East Bay Regional Parks District Planning / Stewardship / GIS Services Department. Oakland, CA.

England, A. S., J. A. Estep, and W. R. Holt. 1995. Nest-site selection and reproductive performance of urban nesting Swainson's hawks in the Central Valley of California. *Journal of Raptor Research* 29(3): 186–197.

England, A. S., M. J. Bechard, and C. S. Houston. 1997. Swainson's hawk (*Buteo swainsoni*). In A. Poole and F. Gill (eds.), *The Birds of North America,* No. 265. The Academy of Natural Sciences, Philadelphia, PA, and the American Ornithologists' Union. Washington, D.C.

Erickson, W. P., G. D. Johnson, M. D. Strickland, D. P. Young, Jr., K. J. Sernka, and R. E. Good. 2001. Avian Collisions with Wind Turbines: a Summary of Existing Studies and Comparison of Other Sources of Avian Collision Mortality in the United States. Prepared for the National Wind Coordinating Committee, Washington, DC.

Estep, J. A. 1989. *Biology, movements, and habitat relationships of the Swainson's hawk in the Central Valley of California.* California Department of Fish and Game, Wildlife Management Division. Sacramento, CA.

Fitch, H. S., R. Swenson, and D. F. Tillotson. 1946. Behavior and food habits of the red-tailed hawk. *Condor* 48:205–237.

Fitzner, R. E. 1980. *Behavioral ecology of the Swainson's hawk (*Buteo swainsoni*) in Washington.* Report prepared for the U.S. Department of Energy's Pacific Northwest Laboratory. Richland, WA. 65 pages.

Gehring, J., P. Kerlinger, and A. M. Manville II. 2009. Communication Towers, Lights, and Birds: Successful Methods of Reducing the Frequency of Avian Collisions. *Ecological Applications* 19:505–514.

Gervais, J. A., D. K. Rosenberg, and L. A. Comrack. 2008. Burrowing Owl (Athene cunicularia). In W. D. Shuford and T. Gardali (eds.). California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, CA, and California Department of Fish and Game, Sacramento, CA.

Goodrich, L. J., and J. Smith. 2008. Raptor migration in North America. In *The State of North America's Birds of Prey* (K. L. Bildstein, J. Smith, and E. Ruelas, eds.). Hawk Mountain Sanctuary, Orwigsburg, PA. Series in Ornithology Number 3. 466 pp.

Grinnell, J., and A. H. Miller. 1944. The Distribution of the Birds of California. *Pacific Coast Avifauna* No. 27. Berkeley, CA: Cooper Ornithological Club.

Grinnell, J., and M. W. Wythe. 1927. Directory to the Bird-Life of the San Francisco Bay Region. *Pacific Coast Avifauna* No. 18, March 29, 1927. Berkeley, CA: Cooper Ornithological Club. Harman, L. M. and J. H.

Haak, B. A. and S. J. Denton. 1979. Subterranean nesting by Prairie Falcon. *Raptor Res.* 13:121-122.

Harman, L. M. and J. H. Barclay. 2007. A summary of California burrowing owl banding records. Pages 123-131 in Barclay, J. H., K. W. Hunting, J. L. Lincer, J. Linthicum, and T. A. Roberts (eds.). *Proceedings of the California Burrowing Owl Symposium, November 2003.* Bird Populations Monographs No. 1. The Institute for Bird Populations and Albion Environmental, Inc. Point Reyes Station, CA, vii + 197 pp.

Harmata, A. R., J. E. Durr, and H. Geduldig. 1978. Home range, activity patterns and habitat use of Prairie Falcons nesting in the Mojave Desert. Unpubl. rep., (Contract No. YA-512-CT8-4389). Colorado Wildl. Services, Fort Collins, CO for U.S. Dep. Inter., Bur. Land Manage., Riverside, CA.

Haug, E. A., and L. W. Oliphant. 1990. Movements, Activity Patterns, and Habitat Use of Burrowing Owls in Saskatchewan. *Journal of Wildlife Management* 54:27–35.

Haug, E. A., B. A. Millsap, and M. S. Martell. 2011. "Burrowing Owl (*Athene cunicularia*)." Revised August 26, 2011, by Poulin, W. R., and L. D. Todd. In *The Birds of North America Online*, edited by A. Poole. Ithaca, New York: Cornell Lab of Ornithology. Accessed December 8, 2012.

Haug, E. A., B. A. Millsap, and M. S. Martell. 1993. The Burrowing Owl (*Speotyto cunicularia*). In A. Poole and F. Gill (eds.), *The Birds of North America,* No. 61. Philadelphia, PA: The Academy of Natural Sciences; Washington, D. C: The American Ornithologists' Union.

Hawk Mountain. 2007. *Conservation Status Reports for the American kestrel and Red-tailed Hawk.* Available: <http://www.hawkmountain.org/raptorpedia/hawks-at-hawk-mountain/hawk-species-at-hawk-mountain/hawk-species-at-hawk-mountain/page.aspx?id=344>. Accessed: October 27, 2011.

HawkWatch International. 2009. Veracruz River of Raptors [Online]. Available: <http://www.hawkwatch.org/conservation-science/migration-research-sites/109-veracruz-river-of-raptors>. Accessed May 9, 2013.

Herzog, S. K. 1996. Wintering Swainson's Hawks in California's Sacramento-San Joaquin River Delta. *Condor* 98: 876–879.

Howell, J. A. 1997. Avian mortality at rotor swept area equivalents, Altamont Pass and Montezuma Hills, California. *Transactions of the Western Section of the Wildlife Society* 33: 24-29.

Howell, J. A. and J. E. DiDonato. 1991. Assessment of avian use and mortality related to wind turbine operations, Altamont Pass, Alameda and Contra Costa Counties, California, September 1998 through August 1989. Final Report submitted to U.S. Windpower, Inc. Livermore, California. 168 pp.

Hull, J. M., R. Anderson, M. Bradbury, J. A. Estep, and H. B. Ernest. 2008. Population structure and genetic diversity in Swainson's Hawks (*Buteo Swainsoni*): implications for conservation. *Conservation Genetics* 9(2): 305-316.

Humple, D. 2008. Loggerhead Shrike (Lanius ludovicianus). In W. D. Shuford and T. Gardali (eds.). California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, CA, and California Department of Fish and Game, Sacramento.

Hunt, W. G., R. E. Jackman, T. L. Brown, J. G. Gilardi, D. E. Driscoll, and L. Culp. 1999. *A Pilot Golden Eagle Population Study in the Altamont Pass Wind Resource Area, California.* Prepared for the National Renewable Energy laboratory, subcontract XCG-4-14200 to the Predatory Bird Research Group, University of California, Santa Cruz.

Hunt, G. 2002. *The Trend of Golden Eagle Territory Occupancy in the Vicinity of the Altamont Pass Wind Resource Area: 2005 Survey.* Prepared for the California Energy Commission, contract 500-01-032, to the Predatory Bird Research Group, University of California, Santa Cruz.

Hunt, G., and T. Hunt. 2006. *The Trend of Golden Eagle Territory Occupancy in the Vicinity of the Altamont Pass Wind Resource Area: 2005 Survey.* Prepared for the California Energy Commission, contract 500-01-032, to the Predatory Bird Research Group, University of California, Santa Cruz, CA. Report to California Energy Commission, Sacramento, CA.

Hunt, W. G., R. E. Jackman, T. L. Brown, D. E. Driscoll, and L. Culp. 1998. *A Population Study of Golden Eagles in the Altamont Pass Wind Resource Area: Population Trend Analysis 1994-1997.* Prepared for the National Renewable Energy laboratory, subcontract XAT-6-16459-01 to the Predatory Bird Research Group, University of California, Santa Cruz.

Huso, M. P. 2011. An estimator of wildlife fatality from observed carcasses. *Environmentrics* 22(3): 318-329.

ICF International. 2012a. *Altamont Pass Wind Resource Area Bird Fatality Study, Bird Years 2005-2010.* October. (ICF #00904.08.) Sacramento, CA. Prepared for Alameda County Community Development Agency, Hayward, CA.

ICF International. 2012b. Altamont Pass Wind Resource Area Alameda County Avian Fatality Monitoring Team data. October. (ICF #00904.08). Sacramento, CA. Prepared for Alameda County Community Development Agency, Hayward, CA.

Insignia Environmental. 2012. *Final Report for the Buena Vista Avian and Bat Monitoring Project: February 2008 to January 2011.* September. Palo Alto, CA. Prepared for Contra Costa County, Martinez, CA.

Johnsgard, P. A. 1900. *Hawks, Eagles and Falcons of North America: Biology and Natural History.* Page 403. Washing and London: Smithsonian Institution Press.

Kaiser, T. J. 1986. Behavior and energetics of Prairie Falcons (Falco mexicanus) breeding in the western Mojave Desert. PhD Thesis. Univ. of California, Los Angeles.

Klute, D. S., L. W. Ayers, M. T. Green, W. H. Howe, S. L. Jones, J. A. Shaffer, S. R. Sheffield, and T. S. Zimmerman. 2003. *Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States.* (Biological Technical Publication FWS/BTP-R6001-2003.) Washington, D.C.: U.S. Department of Interior, Fish and Wildlife Service. 108 pp.

Kochert, M. N., K. Steenhof, C. L. McIntyre, and E. H. Craig. 2002. Golden Eagle (*Aquila chrysaetos*). In A. Poole and F. Gill (eds.), *The Birds of North America,* No. 684. Philadelphia, PA: The Birds of North America, Inc.

Maclaren, P. A., D. E. Runde, and S. Anderson. 1984. A record of tree-nesting Prairie Falcons in Wyoming. *Condor* 86:487-488.

Marti, C. D. 1974. Feeding ecology of four sympatric owls. *Condor* 76:5–61.

Marti, C. D. 1997. Lifetime reproductive success in barn owls near the limit of the species' range. *Auk* 114: 581-592.

Marti, C. D., A. F. Poole, and L. R. Bevier. 2005. Barn Owl (*Tyto alba*). In A. Poole and F. Gill (eds.), *The Birds of North America* Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online. Available: <http://bna.birds.cornell.edu/bna/species/001>. Accessed: December 8, 2012.

Martin, D. J. 1973. Selected aspects of Burrowing Owl ecology and behaviour in central New Mexico. *Condor* 75:446-456.

Miller, A. H. 1931. Systematic revision and natural history of the American shrikes (*Lanius*). *University of California Publications in Zoology* 38:11–242.

Millsap, B. A. 1981. Distributional status of falconiformes in west central Arizona-with notes on ecology, reproductive success and management. U.S. Dep. Inter., Bur. Land Manage., Tech. Note 355.

National Audubon Society. 2011. The Christmas Bird Count Historical Results [Online]. Available: <http://www.christmasbirdcount.org>. Accessed December 12, 2012.

NatureServe. 2012. *NatureServe Explorer: An online encyclopedia of life [web application].* Version 7.1. NatureServe, Arlington, Virginia. Available: <http://www.natureserve.org/explorer>. Accessed: September 11, 2012.

Nelson, R. W. 1974a. Prairie Falcons: nesting attempt on a building and effect of weather on courtship and incubation. *Raptor Res. Foundation Ethology Information Exchange* 1:10-12.

Newton, I. 1977. Breeding strategies in birds of prey. *The Living Bird* 16:51–82.

Newton, I. 1979. *Population ecology of raptors.* Buteo Books. Vermillion, SD.

Ogden, V. T. and M. G. Hornocker. 1977. Nesting density and success of Prairie Falcons in southwestern Idaho. *J. Wildl. Manage.* 41:1-11.

Orloff, S., and A. Flannery. 1992. *Wind turbine effects on avian activity, habitat use and mortality in Altamont Pass and Solano County Wind Resource Areas.* Report to the Planning Departments of Alameda, Contra Costa and Solano Counties and the California Energy Commission, Grant No. 990-89-003 to BioSystems Analysis, Inc., Tiburon, California.

Orloff, S., and A. Flannery. 1996. *A continued examination of avian mortality in the Altamont Pass Wind Resource Area.* August. BioSystems Analysis, Inc., Santa Cruz, CA. Report to California Energy Commission, Sacramento, CA.

Pagel, J. E., D. M. Whittington, and G. T. Allen. 2010. Interim Golden Eagle technical guidance: inventory and monitoring protocols; and other recommendations in support of eagle management and permit issuance. Division of Migratory Bird Management, U.S. Fish and Wildlife Service.

Peeters H. and P. Peeters. 2005. *Raptors of California.* California Natural History Guides Series No. 82. University of California Press. Berkeley and Los Angeles, CA.

Phipps, K. B. 1979. Hunting methods, habitat use and activity patterns of Prairie Falcons in the Snake River Birds of Prey Natural Area, Idaho. Master's Thesis. Western Illinois Univ. Macomb.

Pitcher, E. J. 1977. Nest site selection for Prairie Falcons. *Auk* 94:371.

Platt, S. W. 1981. Prairie Falcon: aspects of population dynamics, individual vocal identification, marking and sexual maturity. PhD Thesis. Brigham Young Univ. Provo, UT.

Polite, C. 1990. *California's wildlife: Barn owl.* California Wildlife Habitat Relationships System, California Interagency Wildlife Task Group, California Department of Fish and Game, Sacramento, CA.

Polite, R. and G. Ahlborn. 1990. *American Kestrel.* Editor: S. Bailey. California Wildlife Habitat Relationships System, California Interagency Wildlife Task Group, California Department of Fish and Game. Available: <http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx>. Accessed: August 10, 2010.

Polite, C., and J. Pratt. 1990. *California's wildlife: red-tailed hawk.* California Wildlife Habitat Relationships System, California Interagency Wildlife Task Group, California Department of Fish and Game, Sacramento, CA.

Preston, C. R., and R. D. Beane. 1993. Red-tailed Hawk (*Buteo jamaicensis*). In A. Poole and F. Gill (eds.), *The Birds of North America.* Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/052>. Accessed: May 2009.

Roppe, J. A., S. M. Siegel, and S. E. Wilder. 1989. Prairie Falcon nesting on transmission towers. *Condor* 91:711-712.

Rosenberg, D. K., J. Gervais, H. Ober, and D. DeSante. 1998. An Adaptive Management Plan for the Burrowing Owl Population at Naval Air Station Lemoore, California.

Sauer, J. R., J. E. Hines, and J. Fallon. 2008. *The North American Breeding Bird Survey, Results and Analysis 1966–2007.* Version 5.15.2008. USGS Patuxent Wildlife Research Center, Laurel, MD.

Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2011. The North American Breeding Bird Survey, Results and Analysis 1966 - 2010. Version 12.07.2011*USGS Patuxent Wildlife Research Center*, Laurel, MD.

Seibert, M. L. 1942. Occurrence and nesting of some birds in the San Francisco Bay region. *Condor* 44: 68–72.

Settlement Agreement. 2007. Settlement Agreement between Golden Gate Audubon Society, Ohlone Audubon Society, Mount Diablo Audubon Society, Santa Clara Valley Audubon Society, Marin Audubon Society, Californians for Renewable Energy, ESI Bay Area GP, Inc., ESI Altamont Acquisitions, Inc. on behalf of Green Ridge Power, LLC, ESI Tehachapi Acquisitions on behalf of Altamont Power, LLC., enXco, Inc., SeaWest Power Resources, LLC, and the Alameda County Board of Supervisors, County of Alameda. January 2007. Available: <http://www.altamontsrc.org/alt_doc/alt_settlement/s1_board_approved_settlement_agreement (55464923_1).pdf>. Accessed: May 21, 2008.

Settlement Agreement. 2010. Settlement Agreement between Golden Gate Audubon Society, Ohlone Audubon Society, Mount Diablo Audubon Society, Santa Clara Valley Audubon Society, Marin Audubon Society, Californians for Renewable Energy; and Green Ridge Power, LLC, Windpower Partners 1991-2, L.P., and Windpower Partners 1992, L.P. and the People of the State of California, ex rel Attorney General. December 2010.

Sherrod, S. K. 1978. Diets of North American Falconi forms. *Journal of Raptor Research* 12:49-121.

Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Sibley, D. 2000. National Audubon Society: The Sibley Guide to Birds. Page 512. New York: Knopf.

Smallwood, J. A., and David M. Bird. 2002. American Kestrel (*Falco sparverius*). In A. Poole and F. Gill (eds.), *The Birds of North America*. Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online. Available: <http://bna.birds.cornell.edu/bna/species/602>. Accessed: July 2009.

Smallwood, K. S. 2007. Estimating Wind Turbine-Caused Bird Mortality. *Journal of Wildlife Management* 71(8):2781–1701.

Smallwood, K. S., 2010. Baseline Avian and Bat Fatality Rates at the Tres Vaqueros Wind Project, Contra Costa County, California. Report to the East Bay Regional Park District. March 21, 2010.

Smallwood, K. S. and B. R. Karas. 2009. Avian and Bat Fatality Rates at Old-Generation and Repowered Wind Turbines in California. *Journal of Wildlife Management* 73:1062-1071.

Smallwood, K. S., and C. Thelander. 2004. *Developing methods to reduce bird mortality in the Altamont Pass Wind Resource Area.* Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. 500-01-019. Sacramento, California. 531 pp.

Smallwood, K. S., and C. G. Thelander. 2005. *Bird mortality at the Altamont Pass Wind Resource Area: March 1998 to September 2001.* Prepared for the National Renewable Energy laboratory, subcontract SR 500-36793 to BioResource Consultants.

Smallwood, K. S., and C. Thelander. 2008. Bird mortality in the Altamont Pass Wind Resource Area, California. *Journal of Wildlife Management* 72: 215-223.

Smallwood, K. S. and L. Neher. 2004. *Repowering the APWRA: Forecasting and Minimizing Avian Mortality without Significant Loss of Power Generation.* California Energy Commission, Public Interest Energy Research Program. CEC-500-2005-005.

Smallwood, K. S., and L. A. Neher. 2010. Siting Repowered Wind Turbines to Minimize Raptor Collisions at the Tres Vaqueros Wind Project, Contra Costa County, California. Draft Report to the East Bay Regional Park District. April 28.

Smallwood, K. S., and L. A. Neher. 2011. *Siting Repowered Wind Turbines to Minimize Raptor Collisions at Vasco Winds.* February 18. in Vasco Winds Repowering Project Final Environmental Impact Report. Contra Costa County Department of Conservation and Development. SCH No. 2010032094. County File No. LP08-2049.

Smallwood, K. S., C. G. Thelander, M. L. Morrison and L. M. Rugge. 2007. Burrowing Owl Mortality in the Altamont Pass Wind Resource Area. *Journal of Wildlife Management.* 71(5): 1513-1524.

Smallwood, K. S., L. A. Neher, and D. A. Bell. 2009. Map-based repowering and reorganization of a wind resource area to minimize burrowing owl and other bird fatalities. *Energies* 2009(2):915-943. Available: <http://www.mdpi.com/1996-1073/2/4/915>.

Smallwood, K. S., L. A. Neher, D. A. Bell, J. E. DiDonato, B. R. Karas, S. A. Snyder, and S. R. Lopez. 2008. Range Management Practices to Reduce Wind Turbine Impacts on Burrowing Owls and Other Raptors in the Altamont Pass Wind Resource Area, California. California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-080.

Steenhof, Karen. 1998. Prairie Falcon (*Falco mexicanus*). In A. Poole and F. Gill (eds.), *The Birds of North America*. Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/346doi:10.2173/bna.346>.

Stoner, E. 1937. Sparrow hawk nests in chimney. *Condor* 39:39.

Thelander, C. G., K. S. Smallwood, and L. Rugge. 2003. Bird Risk Behaviors and Fatalities at the Altamont Pass Wind Resource Area, Period of Performance: March 1998–December 2000. December. National Renewable Energy Laboratory. NREL/SR-500-33829.

Thomsen, L. 1971. Behavior and Ecology of Burrowing Owls on the Oakland Municipal Airport. *Condor* 73:177–192.

Trulio, L. 1997. Burrowing Owl Demography and Habitat Use at Two Urban Sites in Santa Clara County, California. *Journal of Raptor Research* 9:84–89.

U.S. Fish and Wildlife Service. 2010. *Bald and Golden Eagle Protection Act Standards for Review of Wind Energy Projects.* Draft. September. Arlington, VA: Division of Migratory Bird Management.

U.S. Fish and Wildlife Service. 2012a. U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines. March 23, 2012.

U.S. Fish and Wildlife Service. 2012b. *Eagle Conservation Plan Guidance: Module 1 – Land-based Wind Energy Technical Appendices. Draft Under Review*. Division of Migratory Bird Management. August.

U.S. Fish and Wildlife Service. 2011. *Draft Eagle Conservation Plan Guidance.* January.

Wellicome, T. I. 2005. Hatching asynchrony in burrowing owls is influenced by clutch size and hatching success but not by food. *Oecologia* 142:326–334.

Western EcoSystems Technology, Inc. 2008. Diablo Winds Wildlife Monitoring Progress Report. March 2005–February 2007. August 2008. Cheyenne, Wyoming.

Wiley, J. W. 1975. The nesting and reproductive success of Red-tailed Hawks and Red-shouldered Hawks in Orange County, California, 1973. *Condor* 77:133–139.

Warren-Hicks, W. J., R. Wolpert, and J. R. Newman. 2012. *Webinar on Improving Methods for Estimating Fatality of Birds and Bats at Wind Energy Facilities*. California Energy Commission. September 26, 2012.

Woodbridge, B. 1998. California Partners in Flight Riparian Bird Conservation Plan for the Swainson's hawk. Point Reyes Bird Observatory Web site. 16 pp.

Yosef, Reuven. 1996. Loggerhead Shrike (*Lanius ludovicianus*). In A. Poole and F. Gill (eds.), *The Birds of North America*. Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online. Available: <http://bna.birds.cornell.edu/bna/species/231>. Accessed: May 2009.

Zeiner, D. C., W. F. Laudenslayer, Jr., K. E. Mayer, and M. White, eds. 1990. California's Wildlife. Vol. II. Birds. Calif. Dept. of Fish and Game, Sacramento. 732 pp.

8.2 Personal Communications

Bob Power. Executive Director. Santa Clara Valley Audubon Society. October 30, 2009—Email correspondence with Kathryn Gaffney, ICF International, Oakland, CA.

Doug Leslie. Altamont Pass Wind Resource Area Avian Monitoring Team. January 17, 2012—Email correspondence with Lucas Bare, ICF International, Englewood, CO.

Jesse Schwartz. Altamont Pass Wind Resource Area Avian Monitoring Team. November 7, 2011—Telephone call with Lucas Bare, ICF International, Englewood, CO.

Levin Nason. Altamont Pass Wind Resource Area Avian Monitoring Team. November 14, 2012—Email correspondence with Douglas Leslie, ICF International, Sacramento, CA.

Bret Stedman. Manager. California Raptor Center, UC Davis. December 13, 2012—Email correspondence with Lucas Bare, ICF International, Englewood, CO.

9.0 Figures

Figure 1a. Annual Adjusted Fatality Rates for Non-repowered and Repowered APWRA Turbines

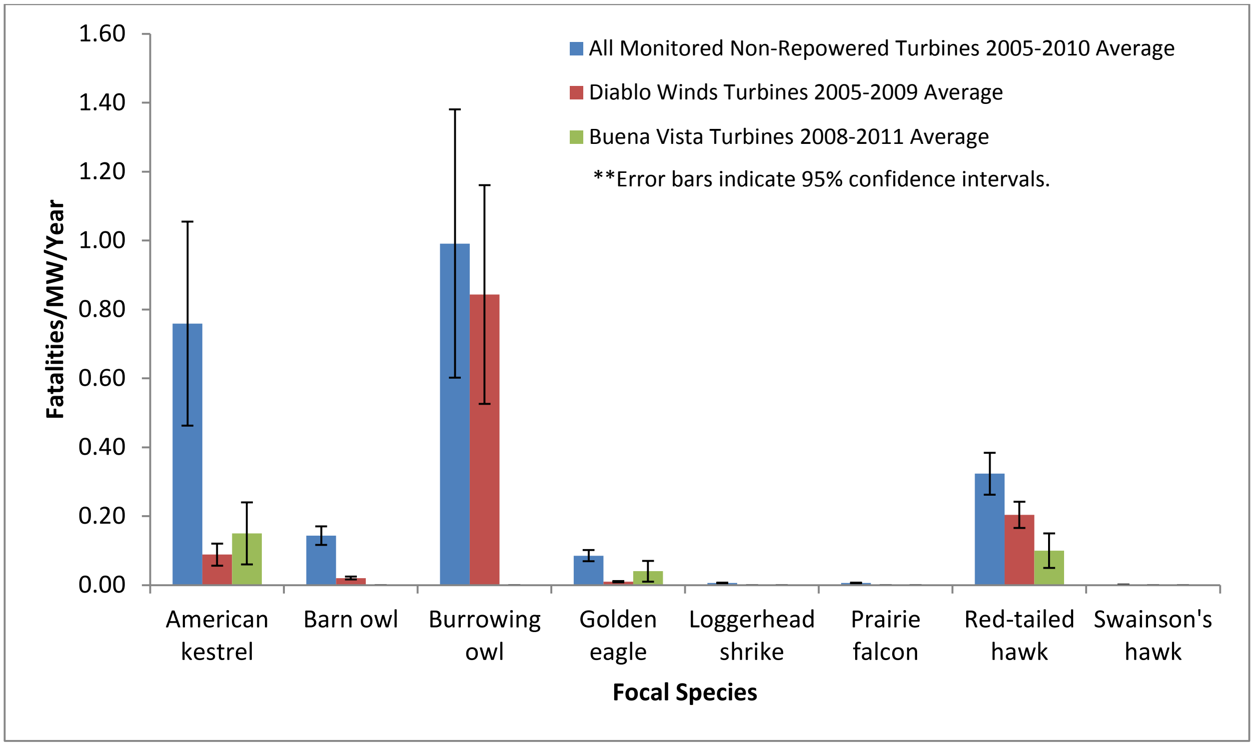


Figure 1b. Annual Adjusted Fatality Rates for Non-repowered and Repowered APWRA Turbines

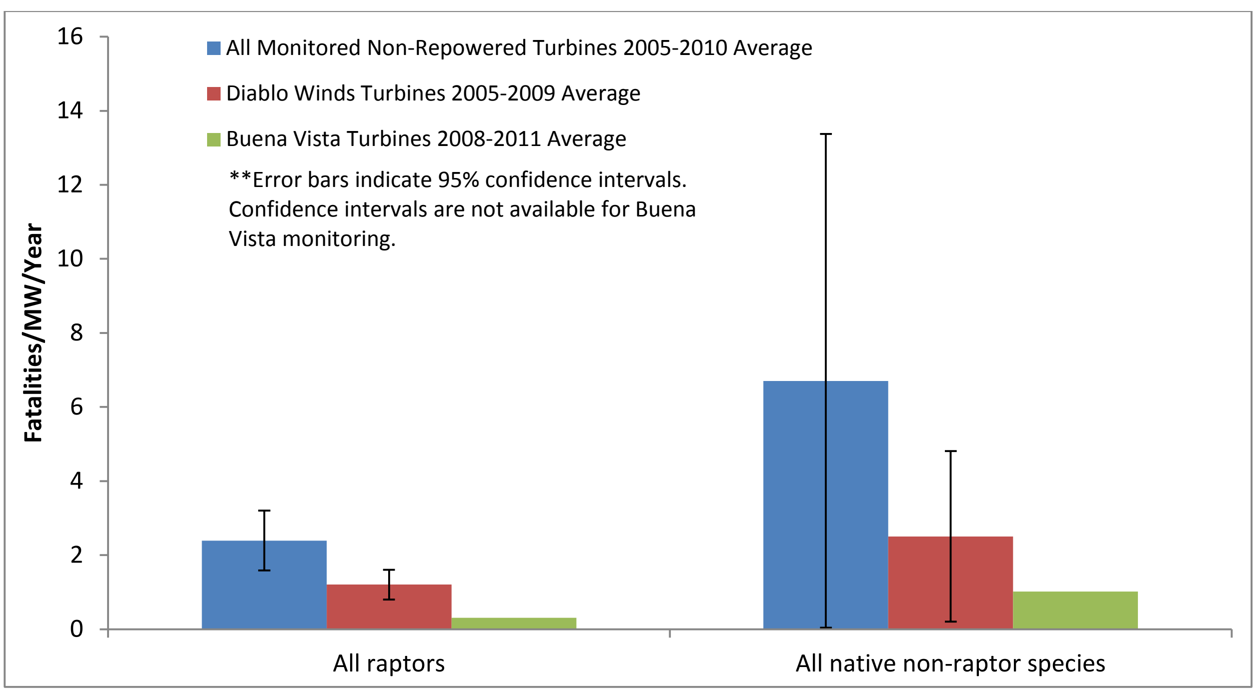


Figure 1 Notes

- Source: ICF International (2012a, 2012b) and Insignia Environmental (2012).
- One barn owl fatality and one prairie falcon fatality were documented at Buena Vista (Insignia Environmental 2012). Adjusted fatality rates are not available.
- For **All Monitored Non-Repowered Turbines 2005-2010 Average**, fatality rates were averaged across monitored turbine operating groups that do not contain repowered turbines for the bird years 2005 through 2010 (October 1 through September 30) based on modified Smallwood (2007) detection probabilities (ICF International 2012a).
- For **Diablo Winds Turbines 2005-2009 Average**, fatality rates were calculated using Diablo Winds turbines only for the 2005 through 2009 bird years based on modified Smallwood (2007) detection probabilities (ICF International 2012b).
- For **Buena Vista Turbines 2008-2011 Average**, fatality rates based on monitoring conducted from February 2008 through January 2011 based on modified Smallwood (2007) detection probabilities (ICF International 2012a).

Figure 2a. Annual Fatalities per Year for Existing and Repowered Project Area

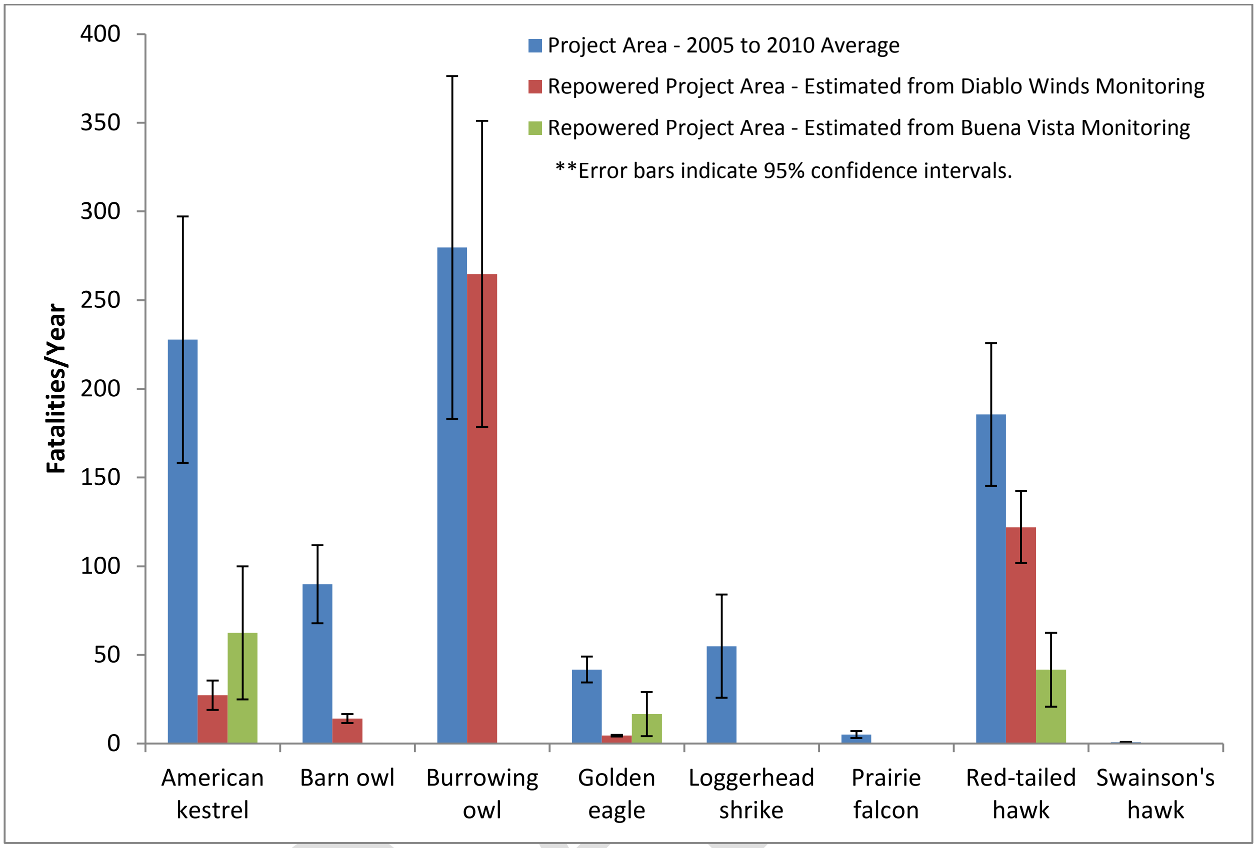


Figure 2b. Annual Fatalities per Year for Existing and Repowered Project Area

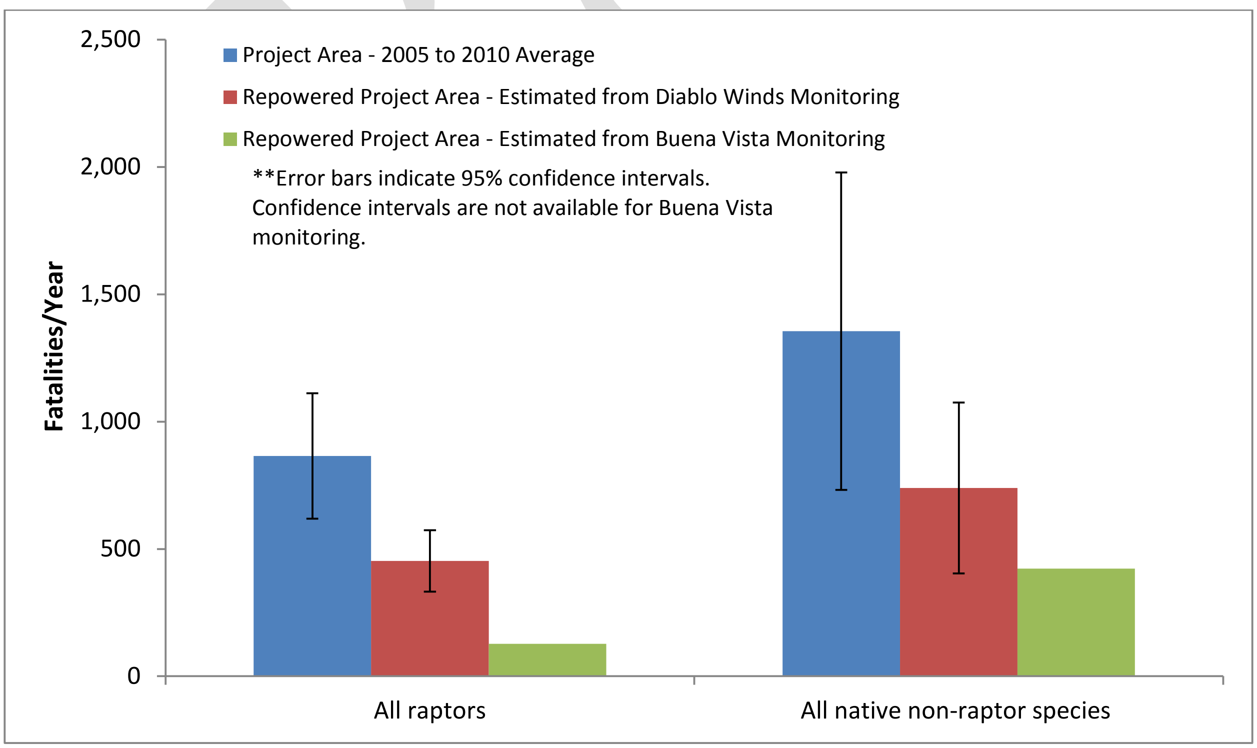


Figure 2 Notes

- Source: ICF International (2012a), ICF International (2012b), Insignia Environmental (2012).
- One barn owl fatality and one prairie falcon fatality were documented at Buena Vista (Insignia Environmental 2012). Adjusted fatality rates are not available.
- For **Project Area – 2005 to 2010 Average**, annual fatalities were averaged across all monitored turbine operating groups in the Project Area, including Diablo Winds turbines, for the 2005 through 2010 bird years (October 1 through September 30) using the Quality Assurance/Quality Control (QAQC) detection probabilities (ICF International 2012a).
- For **Repowered Project Area – Estimated from Diablo Winds Monitoring**, average annual fatalities for the 2005 through 2009 bird years using the QAQC detection probabilities (ICF International 2012a) were multiplied by the maximum allowed installed capacity of the Project Area, 416.4 megawatts, as documented in County of Alameda Community Development Department (1998).
- For **Repowered Project Area – Estimated from Buena Vista Monitoring**, average annual fatalities from 2008 through 2011 based on modified Smallwood (2007) detection probabilities (ICF International 2012a) were multiplied by the maximum allowed installed capacity of the Project Area, 416.4 megawatts, as documented in County of Alameda Community Development Department (1998).

Appendix A
Bird Species Documented at the Altamont Pass Wind Resource Area from 2005 to 2010

[Note to Reader]: Fatality data in this appendix will be quantified pending its update with ICF International (2012b) and Insignia Environmental (2012) monitoring data.

Species	Listing Status[1] State	Listing Status[1] Federal	Live Observation[2]	Fatality[3] at Non-Repowered Turbines	Fatality[3] at Repowered Turbines
American avocet			X		X
American coot			X		X
American crow			X	X	
American kestrel			X	X	X
American pipit				X	
American white pelican			X		
Barn owl			X	X	X
Barn swallow				X	
Black-necked stilt			X		
Black-throated gray warbler					X
Bonaparte's gull				X	
Brewer's blackbird			X	X	
Brown-headed cowbird				X	
Brown Pelican				X	
Burrowing Owl	CSC		X	X	X
California gull			X		X
Canada Goose			X		
Cliff swallow				X	X
Common goldeneye				X	
Common poorwill				X	
Common raven			X	X	X
Cooper's hawk			X		
Dark-eyed junco, slate				X	
Double-crested cormorant			X		
European starling				X	X
Ferruginous hawk			X	X	X
Golden-crowned sparrow				X	
Golden eagle	FP	BGEPA	X	X	X
Great blue heron			X	X	
Great egret				X	
Great-horned owl				X	

Species	Listing Status[1] State	Listing Status[1] Federal	Live Observation[2]	Fatality[3] at Non-Repowered Turbines	Fatality[3] at Repowered Turbines
Greater sandhill crane	FP			X	
Hammond's flycatcher				X	X
Horned lark			X	X	X
House finch					X
House sparrow				X	
House wren				X	
Killdeer				X	
Lesser goldfinch					X
Lincoln sparrow				X	
Loggerhead shrike			X		
Mallard			X	X	X
Mourning dove			X	X	X
Northern flicker				X	
Northern harrier			X	X	
Northern mockingbird				X	
Orange-crowned warbler				X	
Peregrine falcon	FP			X	
Pied-billed grebe					X
Prairie falcon			X	X	X
Red-shouldered hawk			X	X	
Red-tailed hawk			X	X	X
Red-winged blackbird			X	X	
Ring-billed gull			X	X	
Rock pigeon				X	X
Rock wren				X	
Ruby-crowned kinglet					X
Sandhill crane				X	
Savannah sparrow				X	
Say’s phoebe				X	
Sharp-shinned hawk			X		
Snow goose			X		X
Spotted towhee					X
Swainson’s hawk	ST		X	X	
Swainson's thrush				X	X
Townsend's warbler				X	
Tricolored blackbird	CSC			X	
Turkey vulture			X	X	
Violet-green swallow				X	
Warbling vireo				X	
Western gull				X	
Western meadowlark			X	X	X

Species	Listing Status[1] State	Listing Status[1] Federal	Live Observation[2]	Fatality[3] at Non-Repowered Turbines	Fatality[3] at Repowered Turbines
Western tanager				X	X
White-tailed kite			X	X	
White-throated swift				X	
Wild turkey				X	
Wilson's warbler				X	
Yellow warbler	CSC				X
Yellow-billed magpie			X		
Unidentified blackbird				X	
Unidentified duck				X	
Unidentified *Empidonax* spp.				X	

Sources:

ICF International. 2012b. Altamont Pass Wind Resource Area Alameda County Avian Fatality Monitoring Team data. October. (ICF #00904.08). Sacramento, CA. Prepared for Alameda County Community Development Agency, Hayward, CA.

Insignia Environmental. 2012. *Final Report for the Buena Vista Avian and Bat Monitoring Project: February 2008 to January 2011.* September. Palo Alto, CA. Prepared for Contra Costa County, Martinez, CA.

Western EcoSystems Technology, Inc. 2008. Diablo Winds Wildlife Monitoring Progress Report, March 2005 – February 2007. August. Cheyenne, WY.

1 Status:

State

FP Fully protected

SE State listed as endangered

ST State listed as threatened

CSC California species of special concern

Federal

BGEPA Bald Eagle and Golden Eagle Protection Act

FE Federally endangered

FT Federally threatened

Note that most birds are listed under MBTA so MBTA status was not recorded.

2 An "observation" is a monitored occurrence of a live bird or bat. Observation data are compiled from the Buena Vista Avian and Bat Monitoring Project (Insignia Environmental 2012), the Diablo Winds Wildlife Monitoring Progress Report (Western EcoSystems Technology 2008)and the Alameda County Avian Fatality Monitoring Team (ICF International 2912b).

3 A "fatality" is a monitored occurrence of a dead bird the death of which is attributed to turbine facilities. Fatality data are compiled from the Avian Monitoring Team (ICF 2011b) and the Buena Vista Avian and Bat Monitoring Project (Insignia Environmental 2012).

Appendix F2

2007 Settlement Agreement

SETTLEMENT AGREEMENT

THIS AGREEMENT (the "Agreement") is entered into as of this ___th day of January 2007 by and between **Golden Gate Audubon Society**, **Ohlone Audubon Society**, **Mount Diablo Audubon Society**, **Santa Clara Valley Audubon Society**, and **Marin Audubon Society** (collectively, "Audubon"), and **Californians for Renewable Energy** ("CARE," and together with Audubon, "Audubon/CARE"), and **ESI Bay Area GP, Inc., ESI Altamont Acquisitions, Inc. on behalf of Green Ridge Power, LLC, and ESI Tehachapi Acquisitions on behalf of Altamont Power, LLC.** (collectively, "ESI"), **enXco, Inc.**, and **SeaWest Power Resources, LLC** (collectively, along with ESI, the "Wind Power Companies"), and the **Alameda County Board of Supervisors, County of Alameda** (the "County"). Audubon, CARE, the Wind Power Companies and the County are referred to individually as a "Party" and collectively as the "Parties."

R E C I T A L S

This Agreement is made with respect to the following recitals of fact:

1. On September 22, 2005, the Alameda County Board of Supervisors approved conditional use permits ("CUPs") for the operation of wind turbines by the Wind Power Companies, among other entities, at the Altamont Pass Wind Resources Area ("APWRA"). The Alameda County Board of Supervisors concluded that its decision to issue the CUPs was categorically exempt from the California Environmental Quality Act ("CEQA").

2. On or about October 31, 2005 and as amended on or about November 29, 2005, Audubon/CARE petitioned the Alameda County Superior Court for a writ of mandate (Case Nos. RG05239552 & RG05239790) to set aside the Alameda County Board of Supervisors' issuance of the CUPs on various grounds, including that such action violated the County's General Code and CEQA. The Audubon/CARE writ petitions are collectively referred to as the "Action." The Wind Power Companies are Real Parties in Interest in the Action.

3. Beginning in January, 2006, the parties to the Action engaged in a series of discussions in an attempt to resolve their disputes prior to the parties briefing the action on its merits. The discussions included the Parties, represented by legal counsel and their principals, and, after the proposed settlement agreement included consideration of a conservation planning component, representatives of the California Department of Fish and Game. After extensive discussion among and between the various parties, on or about November 6, 2006, Audubon/CARE and the Wind Power Companies agreed to a framework for settling the entire Action. That agreement is embodied in the November 6, 2006 Settlement Framework (the "Settlement Framework"), attached hereto as **Exhibit 1**.

4. The County wishes to enter into this Agreement with the Parties, based on the Settlement Framework, in order to resolve the Action and accordingly modify its existing conditional use permits for wind turbine operations at the AWPRA, in order to continue producing wind energy while further reducing raptor mortality in the APWRA.

5. The Parties desire to enter into this Agreement in order to execute a final settlement of the Action. The terms and conditions of this Agreement are set forth below.

TERMS AND CONDITIONS

NOW THEREFORE, in consideration of the mutual promises and covenants contained in this Agreement, the Parties agree as follows:

1. **County Approval Process.** This Agreement modifies the CUPs with regard to various measures to reduce raptor mortality at the APWRA, as reflected in the modified permit conditions approved by the County concurrently with the County's approval of this Agreement.

2. **Relationship to existing CUPs.**

    (a) The Wind Power Companies hold CUPs with the County through various legal entities. Within each CUP, some turbines are owned beneficially only by Wind Power Companies and some are owned by a Wind Power Company and a non-settling party. Only the turbines owned beneficially solely by Wind Power Companies, with no non-settling party beneficial interest, are affected by this Agreement (the "Applicable Turbines"). The modification of the CUPs is intended to accomplish this objective.

3. **Reduction in raptor mortality.** The Wind Power Companies shall achieve a 50% reduction in raptor mortality within three (3) years of the effective date of this Agreement.

    (a) The baseline for determining the percentage reduction in raptor mortality at the APWRA is thirteen hundred (1300).

        (i) The raptor species that shall be evaluated to determine the percentage reduction in raptor mortality are Golden Eagle, Burrowing Owl, American Kestrel, and Red-Tailed Hawk.

        (ii) The percentage reduction in raptor mortality shall be determined using field monitoring data collected in accordance with the CUPs and scaling factors for searcher efficiency and scavenging as approved by the Scientific Review Committee ("SRC").

        (iii) In the event the above-referenced scaling factors exceed 2.5, the Wind Power Companies, Audubon, and the County, in consultation with the SRC, along with any other individuals or entities that both the Wind Power Companies, Audubon and the County agree to, shall meet and confer to re-determine a mutually acceptable baseline for determining raptor mortality and/or reduction percentage in raptor mortality that triggers adaptive management measures as specified in section 3(c) of this Agreement.

(b) The Wind Power Companies, Audubon, and the County, in consultation with the SRC, shall meet and confer at least annually to determine if mutually acceptable mid-course corrections in measures to reduce raptor mortality are appropriate after the SRC evaluates the prior year's monitoring data. Agreed upon mid-course corrections for the Applicable Turbines shall be forwarded to the County for consideration pursuant to Condition 5 of the CUPs if the measures require permit modifications.

(c) Adaptive management measures will be implemented if a 50% reduction in raptor mortality is not achieved by November 1, 2009.

(i) The SRC will prioritize management measures, including an evaluation of management measures that have not reduced raptor mortality at the expense of energy production, after analyzing field monitoring data. The SRC shall use its best efforts to achieve its prioritization of management efforts by June 1, 2009.

(ii) By August 1, 2009, Wind Power Companies and Audubon will propose an adaptive management plan to the SRC/County for review pursuant to Condition 5 of the CUP if a 50% reduction in raptor mortality has not previously been achieved and is not projected to be achieved by November 1, 2009. The adaptive management plan will be designed to achieve a 50% reduction in raptor mortality with the least impact on energy production, and may include the elimination or reduction of seasonal shutdowns. The SRC shall act (pursuant to Condition 5 of the CUPs, as necessary) on the adaptive management plan for the Applicable Turbines by November 1, 2009.

(iii) Nothing in this Agreement shall preclude the Wind Power Companies from implementing other measures, such as rodent trapping, reasonably designed to reduce raptor fatalities and help achieve the objective of a 50% reduction in raptor mortality, provided the measures are consistent with the objectives of this Agreement and not outside the terms of the CUPs.

4. **Seasonal shutdown.** Wind Power Companies shall cease operations for approximately ½ of existing (non-repowered) operating Applicable Turbines between November 1, 2007 and December 31, 2007 and the remaining ½ of existing (non-repowered) operating Applicable Turbines between January 1, 2008 and February 28, 2008.

5. **Turbine removal or relocation.**

(a) Wind Power Companies shall shut down Tiers 1 and 2 Applicable Turbines within 30 days of the effective date of this Agreement or, in the event an alternative list of Applicable Turbines is presented to the SRC, as specified in section 5(a)(ii), within 15 days of SRC approval of such list, whichever is later.

(i) Tiers 1 and 2 Applicable Turbines means those turbines identified as Tiers 1 or 2 per Smallwood-Spiegel June 2005 report Group C ranking, confirmed by WEST July 2005 (currently 131 turbines unless the remaining 24 turbines are specifically identified by the SRC prior to the implementation date set forth in (a) above) and as therein allocated per each Wind Power Company and per each Wind Power Company's individual projects.

(ii) Any time after the execution of this Agreement, each Wind Power Company may submit to Audubon and the SRC a list and description of high risk Applicable Turbines already shut down and ask for credit against this Tier 1 and 2 shut down requirement. The SRC will grant credit for such Applicable Turbines reasonably determined on a scientific and technical basis to be high risk, provided such Applicable Turbines were shut down on or after May, 2002, and the fact that the Applicable Turbines were not listed as Tier 1 or 2 will not prejudice this evaluation.

(b) Wind Power Companies shall shut down Tier 3 Applicable Turbines or Applicable Turbines identified pursuant to section 5(b)(ii) by October 31, 2008.

(i) Tier 3 Applicable Turbines consist of no more than 152 turbines in total, and no more for each Wind Power Company and each Wind Power Company's individual project than the number allocated to each Wind Power Company and each Wind Power Company's individual project for Tier 3 turbines in the Smallwood-Spiegel June 2005 report, confirmed by WEST in July 2005.

(ii) By July 1, 2007, each Wind Power Company may present to the SRC an alternative list of Applicable Turbines for shutdown and ask for credit against this Tier 3 shutdown requirement. Applicable Turbines for consideration may include previously removed Applicable Turbines that were among those considered in the Smallwood-Spiegel June 2005 report provided such Applicable Turbines were non-derelict when removed. The SRC shall select for shutdown, on a scientific and technical basis, the highest risk Applicable Turbines of those presented to it by each Wind Power Company (Tier 3 list vs. proposed alternatives).

(c) Wind Power Companies shall remove each Applicable Turbine that is subject to a shutdown requirement as specified in this Agreement unless the SRC, on a scientific and technical basis, approves of its continued existence (e.g., end-row turbine that serves as a flight diverter) or renewed operation (e.g., middle of a string with low risk). Any Applicable Turbine may be relocated to a non-Tier 1, 2, or 3 existing turbine site, provided it is relocated in accordance with the criteria specified in Exhibit A attached to the Settlement Framework (Exhibit 1).

6. **Blade painting study.** Wind Power Companies may participate in a SRC approved study to determine whether blade painting reduces raptor mortality. Up to 450

Applicable Turbines may be painted as part of this study, with a corresponding number of Applicable Turbines included as a control group. Turbines shall be painted by December 31, 2007, or as soon thereafter as reasonably possible, depending on the timing of SRC approval of the study design.

(a) Wind Power Companies shall present a proposed before/after control/impact ("BACI") design study to the SRC for review and approval to evaluate the effectiveness of the blade painting program in reducing raptor mortality. The SRC must also approve the blade painting design.

(b) The SRC shall either approve the BACI design study within 30 days from submittal, or respond within 30 days from submittal with changes necessary for approval, so that the BACI design study can be incorporated into the ongoing monitoring program as soon as possible.

(c) Painted blade turbines and control group turbines included in the approved BACI design study shall be exempted from all permanent and/or seasonal shutdown requirements for the period of the study.

(d) Blade painting initial allocations subject to the further provisions of section 6(e) below are as follows:

(i) ESI – up to 285 Applicable Turbines (plus 285 control group Applicable Turbines);

(ii) enXco – up to 108 Applicable Turbines (plus 108 control group Applicable Turbines); and

(iii) SeaWest – up to 57 Applicable Turbines (plus 57 control group Applicable Turbines).

(e) Nothing in subsection (d) shall prevent one Wind Power Company from assuming by mutual agreement all or part of another Wind Power Company's initial allocation for blade-painting. The final allocations of Applicable Turbines beyond the allocations stated in subsection (d), and up to 450 painted Applicable Turbines, shall be by the agreement of the Wind Power Companies and subject to an SRC approved BACI design.

7. **Natural Communities Conservation Plan – Applicable to Activities of Wind Turbine Owners and Operators.**

(a) It is the intent of the Parties to develop a Natural Communities Conservation Plan ("NCCP") pursuant to section 2801 et seq. of the California Fish and Game Code or similar agreement approved by the California Department of Fish and Game ("CDFG") to address the long-term operation of wind turbines at the APWRA and the conservation of impacted species of concern and their natural communities. The NCCP or similar agreement shall only apply to the operation, construction, maintenance and repowering of wind turbines and will not apply to land use development or farming, ranching, or other agricultural activities except with the express consent of the applicable property owners.

(b) The County will be the local sponsor of the NCCP or similar agreement. The Wind Power Companies shall be responsible for funding the County's expenses in serving as local sponsor for the NCCP or similar agreement, including, but not limited to, funding consultants and/or employees necessary to fill this role. This expense shall be divided among the Wind Power Companies as set forth in the CUPs.

(c) The NCCP or similar agreement may lead to modifications to the terms of the CUPs. The Parties acknowledge that future repowering of the Altamont, which plays a central role in the context of the current County CUPs, will also play an important role in the adoption of adaptive management measures as provided for in Section 3 of this agreement and/or in the development of the NCCP or similar agreement. The repowering and shutdown provisions (beginning September 2009, and thereafter) in the CUPs concerning Applicable Turbines have been amended to delete those provisions that are no longer effective for the Wind Power Companies because it is expected that the adaptive management plan and NCCP will supersede those provisions. Future repowering requirements will be governed by the adaptive management plan, the NCCP, or any similar agreement approved by both the County and CDFG. If no modifying documents are agreed to, the existing permit conditions in the CUPs, relating to repowering of Applicable Turbines, will not remain in effect, but the Parties agree that the County may amend the permits in light of then current conditions to address repowering obligations.

(d) The Parties have prepared and executed a draft Planning Agreement for the development of a NCCP, which is attached hereto as **Exhibit 2**. Notwithstanding the foregoing, the terms of this Agreement and the CUPs, as modified by this Agreement, shall remain in full force and effect if the Parties and/or CDFG do not agree to a NCCP or similar agreement.

8. **Release.** Audubon and CARE shall release the County, the Alameda County Board of Supervisors, the Alameda County Planning Department, the East County Board of Zoning Adjustments, and Wind Power Companies from the claims asserted in the Action. Notwithstanding the foregoing, Audubon and CARE shall have the right to enforce the terms of this Agreement. Audubon and CARE shall dismiss with prejudice the Action upon execution and adoption of this Agreement by the Parties.

9. **No admission of wrongdoing.** This Agreement is the result of a compromise with respect to the disputes between the Parties. In no event shall this Agreement be deemed an admission of wrongdoing or liability of any kind by any Party.

10. **Enforcement of agreement.** The Parties agree that any and all disputes, claims or controversies arising out of or relating to this Agreement shall be submitted to mediation before any Party files a lawsuit. Any Party may commence mediation by providing to the

Parties a written request for mediation, setting forth the subject of the dispute and the relief requested. The Parties will cooperate with one another in selecting a mutually agreeable mediator, and in scheduling the mediation proceedings. The Parties covenant that they will participate in the mediation in good faith, and that they will share equally in its costs. The provisions of this mediation clause may be enforced by any Court of competent jurisdiction, and the party seeking enforcement shall be entitled to an award of all costs, fees and expenses, including attorneys' fees, to be paid by the party against whom enforcement is ordered.

11. **Amendments.** Unless expressly permitted by this Agreement, no supplement, modification or amendment of any term, provision or condition of this Agreement (including this paragraph) shall be binding or enforceable unless evidenced in a writing executed by all of the Parties to this Agreement. Notwithstanding the foregoing, this provision does not restrict the role of the SRC pursuant to the terms of the CUPs.

12. **Applicable law.** This Agreement shall be governed exclusively by and construed and enforced exclusively in accordance with and subject to the law of the state of California without regard to its choice of law provisions, except in the event of bankruptcy by any Party, in which event the laws of the United States shall also apply, where appropriate.

13. **Authority to enter into Agreement.** The Parties here represent and warrant that they have reviewed this Agreement with their respective attorneys, and that they have authority to enter into and to sign this Agreement on their behalf.

14. **Counterparts.** The Agreement may be executed in counterparts, each of which shall be deemed an original, and each of which shall constitute together one and the same instrument. The counterparts will be binding on each of the Parties, even though the various Parties may have executed separate counterparts.

15. **Effective date.** The effective date of this Agreement shall be January __, 2007.

Dated: January ___, 2007 GOLDEN GATE AUDUBON SOCIETY

____
Name: ________________________________
Title: ________________________________

Dated January ____, 2007 OHLONE AUDUBON SOCIETY

____
Name: ________________________________
Title: ________________________________

Dated: January ____, 2007 MOUNT DIABLO AUDUBON SOCIETY

____
Name: ________________________________
Title: ________________________________

Dated: January ____, 2007 SANTA CLARA VALLEY AUDUBON SOCIETY

____
Name: ________________________________
Title: ________________________________

Dated: January ____, 2007 MARIN AUDUBON SOCIETY

____
Name: ________________________________
Title: ________________________________

Dated: January ____, 2007 CALIFORNIANS FOR RENEWABLE ENERGY

____
Name: ________________________________
Title: ________________________________

Dated: January ____, 2007 SEAWEST POWER RESOURCES, LLC

____
Name: ________________________________
Title: ________________________________

Dated: January ____, 2007 enXco, INC.

____
Name: ________________________________
Title: ________________________________

Dated: January ____, 2007 ESI Bay Area GP, Inc.

____
Name: ________________________________
Title: ________________________________

Dated: January ____, 2007 ESI Altamont Acquisitions, Inc. on behalf of Green Ridge Power LLC.

____
Name: ________________________________
Title: ________________________________

Dated: January ____, 2007 ESI Tehachapi Acquisitions, Inc. on behalf of Altamont Power, LLC

____
Name: ________________________________
Title: ________________________________

Dated: January ____, 2007 ALAMEDA COUNTY

____
Name: ________________________________
Title: ________________________________

Dated: January ____, 2007 LAW OFFICE OF J. WILLIAM YEATES
Approved as to form:

____
J. William Yeates
Attorney for Golden Gate Audubon Society, Ohlone Audubon Society, Mount Diablo Audubon Society, Santa Clara Valley Audubon Society, and Marin Audubon Society

Dated: January ____, 2007
Approved as to form:

LAW OFFICE OF JOHN C. GABRIELLI

____

John C. Gabrielli
Attorney for CAlifornians for Renewable Energy

Dated: January ____, 2007
Approved as to form:

PAUL, HASTINGS, JANOFSKY & WALKER LLP

____

Peter H. Weiner
Attorney for ESI Bay Area GP, Inc., ESI Altamont Acquisitions, Inc. on behalf of Green Ridge Power, LLC., and ESI Tehachapi Acquisitions, Inc., on behalf of Altamont Power, LLC

Dated: January ____, 2007
Approved as to form:

KAYE SCHOLER LLP

____

George T. Caplan
Attorney for SeaWest Power Resources, LLC and enXco, Inc.

Dated: January ____, 2007
Approved as to form:

ALAMEDA COUNTY

____

Appendix F3

2010 Settlement Agreement

AGREEMENT TO REPOWER TURBINES AT THE ALTAMONT PASS WIND RESOURCES AREA

THIS AGREEMENT (the "Agreement") is entered into as of this 3rd day of December 2010, by and between **Golden Gate Audubon Society, Ohlone Audubon Society, Mount Diablo Audubon Society, Santa Clara Valley Audubon Society, and Marin Audubon Society** (collectively "Audubon"); and **CAlifornians for Renewable Energy** ("CARE"); and **Green Ridge Power LLC, Windpower Partners 1990, L.P., Windpower Partners 1991, L.P., Windpower Partners 1991-2, L.P., and Windpower Partners 1992, L.P.** (collectively, "NextEra Wind"), and the **People of the State of California, ex rel Attorney General** ("AG"). Audubon, CARE, NextEra Wind and the AG are referred to individually as a "Party" and collectively as the "Parties."

RECITALS

This Agreement is made with respect to the following recitals of fact:

A. On September 22, 2005, the Alameda County Board of Supervisors approved conditional use permits ("CUPs") for the operation of existing wind turbines by NextEra Wind and other wind power companies (the "Wind Power Companies") at the Altamont Pass Wind Resources Area ("APWRA").

B. On or about October 2005 Audubon and CARE petitioned the Alameda County Superior Court for a writ of mandate to set aside the CUPs.

C. In January 2007, Audubon, CARE, Alameda County and the Wind Power Companies entered into a settlement agreement ("2007 Settlement Agreement"). On January 11, 2007, Alameda County modified the CUPs for the Wind Power Companies to be consistent with the 2007 Settlement Agreement.

D. The 2007 Settlement Agreement requires the Wind Power Companies to reduce raptor mortality by 50% and to implement adaptive management measures if a 50% reduction in mortality is not achieved. The 2007 Settlement Agreement also contemplates the development of a Natural Communities Conservation Plan ("NCCP")/Habitat Conservation Plan ("HCP") or similar agreement to address the long-term operation of wind turbines at the APWRA.

E. The Parties believe repowering old generation Kenetech 56-100 and KVS 33 turbines ("Old Generation Turbines") to be the most effective measure to reduce mortality at the APWRA.

TERMS AND CONDITIONS

NOW THEREFORE, in consideration of the mutual promises and covenants contained in this Agreement, the Parties agree as follows:

1. Relationship to 2007 Settlement Agreement

The Parties agree that ESI Energy, LLC, ESI Bay Area GP, Inc., ESI Tehachapi Acquisitions, Inc., and ESI Altamont Acquisitions, and their respective affiliates (collectively, the "NextEra Settlers") and NextEra Wind will have satisfied their obligations under the 2007 Settlement Agreement to reduce raptor mortality by 50% provided NextEra Wind is in compliance with this Agreement.

2. Repowering Schedule

NextEra Wind (or, hereinafter, any new entities formed for repowering purposes) will repower the Old Generation Turbines it currently owns and operates in the APWRA, as the APWRA is currently delineated in Alameda and Contra Costa Counties, as soon as commercially reasonable as defined below, in not more than three phases, each phase representing up to approximately 80 MW, in accordance with the terms of this Agreement. In order to repower existing Old Generation Turbines for Phases 2 and 3 as specified below, NextEra Wind may need to exchange certain Old Generation Turbines for a similar number of Old Generation Turbines that, as of the effective date of this Agreement, are under the control of another wind turbine operator in the APWRA. In the event NextEra Wind acquires additional turbines after the effective date of this Agreement, other than those Old Generation Turbines that may be acquired pursuant to an exchange to facilitate repowering of Phases 2 and 3, NextEra Wind shall repower such turbines in accordance with Section 2.4 below.

2.1 Phase 1

Phase 1 will be based in Contra Costa County. Phase 1 will be described in the Environmental Impact Report ("EIR") Contra Costa County is preparing for the Vasco Winds project. NextEra Wind will repower Phase I promptly after all necessary local, state and/or federal entitlements, permits, certifications or similar approvals (collectively referred to as "Approvals") are obtained. If Approvals are obtained by February 28, 2011, NextEra Wind will repower Phase 1 by December 31, 2011, unless there are circumstances beyond NextEra Wind's control as provided in Section 3.

Regardless of whether Approvals are obtained by February 28, 2011, NextEra Wind will continue to use all commercially reasonable efforts to repower the Phase 1 turbines by December 31, 2012.

2.2 Phase 2

Phase 2 will be based in Alameda County. Phase 2 will be described in a programmatic EIR that Alameda County prepares for repowering the Alameda portion of the APWRA or a project specific EIR to address NextEra Wind's proposed project. NextEra Wind will repower Phase 2 promptly after all Approvals are obtained. If Approvals are obtained by September 30, 2011, NextEra Wind will repower Phase 2 by December 31, 2012, barring unforeseen delays. If Approvals are obtained by September 30, 2012, NextEra Wind will repower Phase 2 by December 31, 2013, unless there are circumstances beyond NextEra Wind's control as provided in Section 3. Completion of Phase 1 shall not be a prerequisite for initiation of Phase 2.

Regardless of whether Approvals are obtained by September 30, 2012, NextEra Wind agrees it will continue to use all commercially reasonable efforts to repower the Phase 2 turbines by December 31, 2014.

2.3 Phase 3

Phase 3 will be based in Alameda County. Phase 3 may be described in a focused EIR that tiers off of Alameda County's programmatic EIR. NextEra Wind will repower Phase 3 promptly after all Approvals are obtained. If Approvals for Phase 2 are obtained by September 30, 2011 and Approvals for Phase 3 are obtained by September 30, 2012, NextEra Wind will repower Phase 3 by December 31, 2013, barring unforeseen delays. If Approvals for Phase 2 are obtained by September 30, 2012 and Approvals for Phase 3 are obtained by September 30, 2013, NextEra Wind will repower Phase 3 by December 31, 2014, unless there are circumstances beyond NextEra Wind's control as provided in Section 3. Notwithstanding the foregoing, NextEra Wind may repower Phases 2 and 3 simultaneously.

Regardless of whether Approvals are obtained by September 30, 2013, NextEra Wind agrees it will continue to use all commercially reasonable efforts to repower the Phase 3 turbines by September 30, 2015.

2.4 Subsequently acquired turbines

If, after the effective date of this Agreement, NextEra Wind (or any entities formed for such purposes relative to this subsection) acquires non-repowered turbines (including but not limited to Kenetech 56-100 and KVS-33 turbines) from current owners or operators in the APWRA, NextEra Wind will use commercially reasonable efforts to coordinate repowering of such turbines with the repowering schedule outlined above. Notwithstanding the foregoing, NextEra Wind shall shutdown such subsequently acquired turbines no later than one (1) year after the commercial operation date ("COD") for Phase 3 or the date of their acquisition, whichever is later. NextEra Wind shall use commercially reasonable efforts to remove all subsequently acquired turbines within three (3) months and in no event more than six (6) months after their shutdown. Prior to repowering, such turbines shall be subject to the 2007 Settlement Agreement. Notwithstanding the foregoing, Old Generation Turbines acquired pursuant to the exchange outlined in Section 2 shall be repowered pursuant to the schedule for Phases 2 and 3.

3. Commercially Reasonable Efforts; Meet and Confer Requirements

For each phase of repowering, NextEra Wind shall exercise all reasonable and good faith efforts and use all reasonable due diligence to enter into a power purchase agreement under commercially reasonable terms, and to obtain all necessary Approvals to satisfy the requirements of that power purchase agreement in order to meet the repowering schedules specified in Sections 2.1 through 2.4 herein. Provided NextEra Wind exercises all reasonable and good faith efforts and uses all reasonable due diligence, NextEra Wind shall not be deemed in violation of this Agreement for failing to repower in accordance with the schedules specified in Sections 2.1 through 2.4 herein. Notwithstanding the foregoing, NextEra Wind shall shut down all Old Generation Turbines it owns and operates no later than November 1, 2015 and shall remove any and all such turbines within the APRWA no later than March 15, 2016 except as provided for in section 2.4. Notwithstanding any provision in this Agreement to the contrary, NextEra Wind shall have no liability to any of the Parties for failure to repower in accordance with its obligations under this Agreement so long as NextEra Wind satisfies its shut down and removal obligations as described in the preceding sentence.

The Parties recognize that, despite the use of commercially reasonable efforts, NextEra Wind may not be able to meet one or more of the repowering schedules specified in Sections 2.1 through 2.4, due to circumstances that are beyond its control, such as unavailability of turbines, or inability to obtain Approvals or commercially reasonable power purchase agreements despite NextEra Wind's reasonable, good faith efforts and the exercise of all reasonable due diligence. If NextEra Wind cannot meet any or all of the repowering schedules specified in Sections 2.1 through 2.4 due to circumstances beyond its control, NextEra Wind shall notify the other Parties to this Agreement in writing within thirty (30) days after NextEra Wind reasonably determines that it will be unable to do so. NextEra Wind shall propose a place within Alameda County, and possible dates and times for the Parties to meet and confer within thirty (30) days after NextEra Wind provides such written notification, unless the Parties agree in writing to an alternative time frame to meet and confer. Ten (10) days prior to the agreed upon date and time for the meet and confer meeting of the Parties, NextEra Wind shall provide written support for why one or more of the repowering schedules in Section 2 cannot be met and shall provide a proposed new schedule for repowering. Any new schedule proposed by NextEra Wind and/or agreed to by the Parties does not alter NextEra Wind's obligation to shut down all Old Generation Turbines it owns or operates within the APWRA by November 1, 2015 and remove such turbines within the APWRA by March 15, 2016 and to shut down all subsequently acquired turbines as provided for in Section 2.4.

If the Parties are unable to reach agreement on a new repowering schedule, NextEra Wind shall operate any remaining non-repowered turbines according to the Avian Wildlife Protection Program and Schedule in NextEra Wind's Conditional Use Permits adopted on January 11, 2007 (Exhibit G-1) by the Alameda County Board of Supervisors, including any requirements to remove High Risk Turbines (hazardous turbines ranked 7.0 and above) and Unproductive Turbines and other requirements described in any County-approved adaptive management plan. Notwithstanding the foregoing, NextEra Wind may apply to the Alameda County Scientific Review Committee ("SRC") for credit for removal of any High Risk Turbines due to repowering already achieved and/or removal of turbines that have been or will be required pursuant to this Agreement that are in excess of what would otherwise be required pursuant to the Avian Wildlife Protection Program and Schedule, as amended by any County-approved adaptive management plan.

4. Siting of Repowered Turbines

NextEra Wind shall site repowered turbines within each of the three phases of repowering described in Sections 2.1 through 2.3 based on the best scientific and commercial data, including studies that rely on methods in peer-reviewed scientific journals, which are available at the time the draft NextEra Wind is circulated for public and agency review and comment for each applicable phase of repowering. The Parties agree that siting of repowered turbines shall be based on field data that confirm the behavior, utilization and distribution patterns of affected avian and bat species prior to the installation of any new repowered turbines, as well as based on appropriate computer models that predict the most dangerous locations for birds and bats based on site geography and topography. The Parties agree that utilizing field data and computer modeling prior to the installation of any new repowered turbines within each phase is essential for ensuring the maximum possible avoidance and reduction of avian and bat mortality from the current old-generation turbines.

The Parties further agree that, in addition to siting of each phase based on pre-construction geographic and topographic surveys and direct observations and modeling of bird and bat utilization and behavior at the site, siting of Phase 2 and each subsequent phase also shall be based on post-construction monitoring data from each applicable earlier phase (fatality and bird and bat utilization and behavior monitoring), as well as on monitoring data, reports and studies from other repowering projects. The post-construction monitoring data shall be used to evaluate the validity of the previous pre-construction siting evaluations and to update and improve the siting evaluations for each subsequent repowering phase.

4.1 Phase 1 siting

Phase 1 turbines will be sited by incorporating the analysis included in Smallwood and Neher, *Siting Repowered Turbines to Minimize Raptor Collisions at Vasco Winds*, 03 June 2010 ("Vasco Winds Siting Report"), which evaluates a digital elevation model (DEM) and raptor use and behavior data to develop geographical and topographical map-based predictive models of where raptors more often fly and perform specific hazardous behaviors such that location of repowered turbines in these areas would create the greatest risk to raptors.

4.2 Phases 2 and 3 and subsequently acquired turbines siting

Phases 2 and 3 and subsequently acquired turbines will be sited by incorporating (when scientifically and technically applicable) the Vasco Winds Siting Report, as well as post-construction monitoring data of each applicable earlier Phase, and pre-construction geographical and topographical map-based predictive models based on raptor use and behavior studies in the APWRA, and any additional studies published in peer-reviewed scientific journals that are in existence at the time the draft EIR for the particular repowering phase is circulated for agency and public review and comment.

The Parties shall meet and confer to discuss the siting for each repowering phase prior to NextEra Wind submitting the siting plan for the final array of turbines for each repowering phase to Alameda County for environmental review. NextEra Wind shall notify the other Parties to this Agreement in writing, proposing a place within Alameda County and possible dates for the Parties to meet and confer within twenty (20) days after NextEra Wind provides such written notification, unless the Parties agree in writing to an alternative time frame to meet and confer. Ten (10) days prior to the agreed upon date and time for the meet and confer meeting, NextEra Wind shall provide the other Parties to this Agreement a siting plan and written explanation of the siting of the proposed turbines. The written explanation shall include a justification for the deviation(s), if any, from any map-based predictive models as described above. Additionally, the consultant who prepared the map-based predictive models shall make a technical presentation during the meet and confer meeting. The Parties agree to work in good faith to resolve any disagreement they may have over the proposed siting plan. In the event the Parties are unable to resolve their differences, the AG and/or Audubon and/or CARE may submit comments to the SRC explaining their concerns.

NextEra Wind agrees to consult with the SRC during preparation of the EIRs for Phases 2 and 3 in accordance with the terms of the Conditional Use Permits. The Parties agree that the SRC may assist in the technical evaluation of the scope and content of the EIRs to be prepared for Phases 2 and 3, respectively. The Parties agree that the SRC must be given adequate opportunity to review and comment on the draft EIRs for Phases 2 and 3.

5. Monitoring and Further Management Measures

5.1 Post-construction monitoring

Each phase of repowered turbines will be subject to three years of post-construction monitoring unless additional monitoring is required pursuant to Section 5.2 below. Post-construction monitoring shall begin no later than three (3) months after the COD for each phase. Post-construction monitoring shall include collecting field data on behavior, utilization and distribution patterns of affected avian and bat species in addition to fatalities. In addition, each phase of repowering shall be subject to two years of further monitoring commencing on the tenth anniversary of its COD. NextEra Wind also agrees to provide access to qualified third parties to conduct any additional monitoring after the initial three year monitoring period has expired and before the additional two year monitoring period has commenced, and after the additional two year monitoring period has expired, provided that such additional monitoring utilizes scientifically valid monitoring protocols that yield results which are reasonably comparable to other efforts to monitor NextEra Wind's repowered turbines. The initial three year monitoring period and the subsequent two year monitoring period together shall constitute the post-construction monitoring period.

NextEra Wind agrees to implement monitoring of all repowered turbines for fatalities pursuant to an enforceable monitoring program established in consultation with the Contra Costa County Technical Advisory Committee ("TAC") established pursuant to Contra Costa County's Vasco Winds EIR or the SRC, as applicable. The monitoring shall use red-tailed hawks, golden eagles, American kestrels and burrowing owls ("Focal Raptor Species") and bats as benchmarks for evaluating the effectiveness of the overall NextEra Wind repowering effort pursuant to Section 2 herein and to inform and update siting analyses for each subsequent phase of the overall repowering effort and for any other future repowering efforts. NextEra Wind also will conduct bird and bat utilization and behavior studies, in consultation with the TAC or the SRC, for each phase of repowering in order to inform and update siting analyses for each subsequent phase of the overall NextEra Wind repowering effort and for any other future repowering efforts. NextEra Wind also shall monitor each repowered turbine at least once per month for the duration of the post-construction monitoring period for fatalities of the four focal raptor species, bats and all other bird species, as recommended by the TAC and the SRC, as appropriate. Finally, NextEra Wind shall monitor a subset (30%) of the repowered turbines at least twice per month for the duration of the post-construction monitoring period for each phase of repowering for fatalities, bird and bat utilization and/or behavior, in consultation with the TAC or the SRC, as appropriate.

Post-construction monitoring shall be conducted by a reputable consultant with applicable experience ("Monitor"). NextEra Wind shall select the Monitor from the following list: Insignia Environmental, Ventus Environmental Solutions, CH2M Hill, or another Monitor recommended by the SRC or TAC or agreed to by the Parties. Post-construction monitoring shall not exceed $300,000 annually per phase, including the production of monitoring reports, as adjusted for inflation.

The Monitor shall prepare interim, annual monitoring reports within three months of completing each year of post-construction monitoring, and shall prepare a final three year Monitoring Report within six months of completing three years of post-construction monitoring for each phase of repowering and a final two year Monitoring Report within six months of completing two years of post-construction monitoring. All monitoring reports shall report adjusted and unadjusted annual fatalities for the Focal Raptor Species, bats and all other bird species on a per-turbine and per megawatt basis. The monitoring reports shall also summarize the results of the bird and bat behavior and use studies for the preceding one or three years, as applicable. The Monitor shall supplement the final three year Monitoring Report for each repowering phase with subsequent monitoring data collected in accordance with this Agreement.

5.2 Fatality reduction measures

The SRC or TAC, as applicable, shall review the final three year Monitoring Report for each repowering phase to evaluate whether any repowered turbines are causing significantly disproportionate Focal Raptor and/or bat fatalities relative to other turbines included within that particular phase of repowering. If one or more turbines are causing significantly disproportionate Focal Raptor or bat fatalities, then the SRC or TAC, as applicable, in consultation with the Parties, may recommend to the Planning Director of the applicable county additional focused monitoring and/or management measures designed to reduce the fatalities attributable to those turbines; provided, however, that such measures shall not include relocation or permanent shutdown of any repowered turbine. NextEra Wind, in its sole discretion, shall determine whether to implement the recommended management measures and/or conduct the additional focused monitoring. Notwithstanding the foregoing, the Parties acknowledge that fatality reduction or other measures may be required pursuant to applicable law including but not limited to the federal Endangered Species Act (16 U.S.C §§ 1530 *et seq.),* Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668-668d), Migratory Bird Treaty Act (16 U.S.C. §§ 703-712) or the California Endangered Species Act (California Fish and Game Code, §§ 2050, *et seq.*).

5.3 Obligations regarding existing turbines

NextEra Wind's obligations under Avian Wildlife Protection Program and Schedule in NextEra Wind's Conditional Use Permits adopted on January 11, 2007 (Exhibit G-1) to monitor existing non-repowered Old Generation and other turbines and implement winter seasonal shutdown shall continue until such turbines are removed.

5.4 Monitoring reports

All monitoring reports, including all raw monitoring data upon which the reports are based, shall be made available to members of the TAC, the SRC and the public as promptly as possible, but in any event no later than thirty (30) days after the report is produced.

5.5 Relationship to NCCP/HCP

If NextEra Wind participates in an approved Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP) for the APWRA, the provisions of Section 5 of this Agreement shall be replaced by the monitoring and adaptive management requirements of the NCCP/HCP. If NextEra Wind participates in an NCCP/HCP that is ultimately approved by the federal and state wildlife agencies, such plan also shall supersede Section 6 of this Agreement, provided the NCCP/HCP contains measures to fully compensate for any ongoing fatalities of, and to provide an overall net conservation benefit for the Focal Raptor Species and other covered species, including bats.

6. Mitigation Fee for Ongoing Harm to Focal Raptor Fatalities

To compensate for ongoing fatalities of the bird and bat species identified in the monitoring reports required by Section 5.4, NextEra Wind agrees to pay a mitigation fee of $10,500 per megawatt of installed capacity for each phase of repowering (including subsequently acquired turbines). The fee shall be paid in three annual installments with the first payment due no later than three months of the COD for each phase. NextEra Wind shall notify the Parties in writing of the COD for each phase within 14 days of the COD. 50% of the total fees for each phase shall be paid to the California Energy Commission's Public Integrated Energy Research Program ("PIER") for scientific research on the effects of wind turbines on birds and bats at the APWRA; and 50% of the total fees shall be paid to a fund to be administered by the East Bay Regional Park District ("EBRPD"), the Livermore Area Regional Park District ("LARPD"), or any other entity identified in the NCCP/HCP conservation plan, or a combination of those entities for conservation efforts for the benefit of those bird and bat species and their habitat in the greater area encompassed by and surrounding the APWRA. Notwithstanding the foregoing, before providing funding to the recipient(s), the Parties shall meet with the recipient(s) in an effort to negotiate a Memorandum of Understanding ("MOU") ensuring that the funds will be used consistent with this Agreement. If no such MOU can be reached, the Parties will meet and determine how to reallocate the funds for the benefit of those bird and bat species and their habitat in the greater area encompassed by and surrounding the APWRA.

7. CEQA Process and Permitting

7.1 Comments

Provided NextEra Wind is in compliance with all material aspects of this Agreement as described in Section 10, the AG, Audubon and CARE shall not oppose or challenge the certification of any EIR or any entitlements for any repowering phase. Notwithstanding the foregoing, the AG, Audubon and CARE may submit comments on the adequacy of the environmental documentation for each phase of repowering. Prior to submitting any comments, the AG, Audubon and/or CARE shall first meet and confer with NextEra Wind and make a good faith effort to resolve any concerns.

7.2 Relationship to mitigation measures

The Parties agree that mitigation required pursuant to this Agreement shall count towards any compensatory mitigation requirements imposed pursuant to CEQA and other local, state or federal Approvals.

7.3 Incorporation of provisions of Agreement into EIRs for repowering

While recognizing that final decisions regarding permit conditions and environmental documents are within the purview of the applicable permitting agencies, the Parties agree to use their best efforts to ensure that the provisions of this Agreement, including but not limited to siting and monitoring of repowered turbines, mortality reduction measures, and mitigation funds for unavoidable ongoing avian fatalities, will be incorporated as conditions of approval for local government permits approved for each phase of the overall NextEra Wind repowering effort, and as mitigation and monitoring measures in the final EIRs certified by Contra Costa and Alameda Counties for each phase of the overall NextEra Wind repowering effort, and any adaptive management plan approved by Alameda County.

8. Covenants Not to Sue

The AG, Audubon and CARE hereby release any and all existing and future claims against NextEra Wind (including any new entities formed for repowering or other purposes stated herein) and the NextEra Settlers, with respect to any and all avian and bat mortality at the APWRA for existing and repowered turbines. If, for any reason, this Agreement or any portion thereof is terminated or otherwise deemed invalid, the release of existing and future claims by the AG, Audubon and CARE will continue to apply to any phase of repowering for which Approvals have been obtained.

9. Successors, Assigns and Affiliates

This Agreement shall be binding upon the successors, assigns and affiliates of the Parties.

10. Enforcement

The Parties shall make all reasonable efforts to resolve their disputes and disagreements regarding the meaning of "compliance with" and/or "implementation of" this Agreement informally and in good faith prior to seeking any judicial relief to enforce the terms of this Agreement. If any Party has a dispute concerning the meaning of "compliance with" and/or "implementation of" this Agreement, that Party shall send a written notice to all other Parties that specifies the nature of the dispute and requests resolution of the dispute.

Upon receipt of such written notification, the Party receiving such notice shall either send the other Parties written notice within seven (7) days of receipt that it intends to cure and shall cure the alleged deficiency within sixty (60) days; or, if the Party receiving the notice is unable to cure the alleged deficiency or disputes the alleged deficiency, that Party receiving such notice shall provide written notice to this effect to all Parties within seven (7) days of receipt of the notification.

If the Party receiving the notice disputes the alleged deficiency, the Parties shall initiate informal negotiations to resolve the dispute. Such period of informal negotiations shall not extend beyond sixty (60) days from the date on which the Party receiving the notice requests such negotiations, unless the Parties agree otherwise in writing. If the alleged violation is not remedied or the Parties fail to reach an agreement during the 60-day informal negotiation period, the noticing Party may seek judicial relief to enforce the terms of this Agreement in superior court.

11. Obligation to Terminate Existing Financing

Certain assets of NextEra Wind at the APWRA, including the existing Old Generation turbines, are subject to an existing financing agreement. NextEra Wind is in the process of terminating that financing agreement with respect to the existing APWRA NextEra Wind assets and has received lender approval to do so on or about December 1, 2010. Because the termination of the existing financing agreement must be completed, and the mortgage on the existing turbines and other assets satisfied, before NextEra Wind commits to decommissioning the existing turbines, this Agreement, which provides for such decommissioning, cannot become binding until the mortgage on the applicable NextEra Wind APWRA assets is satisfied. NextEra Wind characterizes the financing change as ministerial in light of the lender approval. In the very unlikely event that the financing change has not occurred by January 1, 2011, this Agreement is null and void, and NextEra Wind shall be subject to all obligations of the Avian Wildlife Protection Program and Schedule in NextEra Wind's Conditional Use Permits adopted on January 11, 2007 (Exhibit G-1), as amended by the County-approved adaptive management plan. NextEra Wind will notify the Parties to this Agreement when such satisfaction has occurred, or whether it will not occur, promptly, within 7 days after such an event becomes known to NextEra Wind. If such satisfaction has not occurred by January 1, 2011, the Parties agree to meet and confer within thirty days and use their best efforts to reach a new agreement for repowering that addresses the financing change issue.

12. No Admission of Wrongdoing

This Agreement is the result of a compromise with respect to the disputes between the Parties. In no event shall this Agreement be deemed an admission of wrongdoing or liability of any kind by any Party.

13. Amendments

Unless expressly permitted by this Agreement, no supplement, modification or amendment of any term, provision or condition of this Agreement (including this section) shall be binding or enforceable unless evidenced in a writing executed by all of the Parties to this Agreement.

14. Applicable Law

This Agreement shall be governed exclusively by and construed and enforced exclusively in accordance with and subject to the law of the state of California without regard to its choice of law provisions, except in the event of bankruptcy by any Party, in which event the laws of the United States shall also apply, where appropriate.

15. Authority to Enter into Agreement

The Parties here represent and warrant that they have reviewed this Agreement with their respective attorneys, and that they have authority to enter into and sign this Agreement on their behalf.

16. Counterparts

This Agreement may be executed in counterparts, each of which shall be deemed an original, and each of which shall constitute together one and the same instrument. The counterparts will be binding on each of the Parties, even though the various Parties may have executed separate counterparts.

Dated: December 3, 2010

GREEN RIDGE POWER LLC

BY: ______________________

ITS: President

TJ Tuscai
President

Dated: December 3, 2010

WINDPOWER PARTNERS 1990, L.P.

BY: ESI BAY AREA GP, INC

ITS: General Partner

BY: ______________________

ITS: President

TJ Tuscai
President

Dated: December 3, 2010

WINDPOWER PARTNERS 1991, L.P.

BY: ESI BAY AREA GP, INC

ITS: General Partner

BY: ______________________

ITS: President

TJ Tuscai
President

Dated: December 3, 2010

WINDPOWER PARTNERS 1991-2, L.P.

BY: ESI BAY AREA GP, INC

ITS: General Partner

BY: ______________________

ITS: President

TJ Tuscai
President

Dated: December 3, 2010

WINDPOWER PARTNERS 1992, L.P.

BY: ESI BAY AREA GP, INC

ITS: General Partner

BY: ______________________

ITS: President

TJ Tuscai
President

Dated: December 3, 2010

GOLDEN GATE AUDUBON SOCIETY,
OHLONE AUDUBON SOCIETY,
MOUNT DIABLO AUDUBON SOCIETY,
SANTA CLARA VALLEY AUDUBON SOCIETY and
MARIN AUDUBON SOCIETY

Bill Yeates

Name: Bill Yeates, Kenyon Yeates LLP
Title: Attorney representing
Golden Gate, Ohlone, Mount Diablo, Santa Clara Valley, and Marin Audubon Societies.

Dated: December __, 2010

CALIFORNIANS FOR RENEWABLE ENERGY

Name: Michael E. Boyd
Title: President of the Board of Directors

Dated: December __, 2010

PEOPLE OF THE STATE OF CALIFORNIA
EX REL. ATTORNEY GENERAL

Name: Ken Alex
Title: Senior Assistant Attorney General

Dated: December ___, 2010

GOLDEN GATE AUDUBON SOCIETY,
OHLONE AUDUBON SOCIETY,
MOUNT DIABLO AUDUBON SOCIETY,
SANTA CLARA VALLEY AUDUBON SOCIETY and
MARIN AUDUBON SOCIETY

____
Name: Bill Yeates, Kenyon Yeates LLP
Title: Attorney representing
Golden Gate, Ohlone, Mount Diablo, Santa Clara Valley, and Marin Audubon Societies.

Dated: December __, 2010

CALIFORNIANS FOR RENEWABLE ENERGY

Michael E. Boyd
____
Name: Michael E. Boyd
Title: President of the Board of Directors

Dated: December __, 2010

PEOPLE OF THE STATE OF CALIFORNIA
EX REL. ATTORNEY GENERAL

____
Name: Ken Alex
Title: Senior Assistant Attorney General

Dated: December ___, 2010

GOLDEN GATE AUDUBON SOCIETY,
OHLONE AUDUBON SOCIETY,
MOUNT DIABLO AUDUBON SOCIETY,
SANTA CLARA VALLEY AUDUBON SOCIETY and
MARIN AUDUBON SOCIETY

____

Name: Bill Yeates, Kenyon Yeates LLP
Title: Attorney representing
Golden Gate, Ohlone, Mount Diablo, Santa Clara Valley, and Marin Audubon Societies.

Dated: December __, 2010

CALIFORNIANS FOR RENEWABLE ENERGY

____

Name: Michael E. Boyd
Title: President of the Board of Directors

Dated: December 3, 2010

PEOPLE OF THE STATE OF CALIFORNIA
EX REL. ATTORNEY GENERAL

Ken Alex

Name: Ken Alex
Title: Senior Assistant Attorney General

Appendix F4

SRC Guidelines for Siting Wind Turbines

GUIDELINES FOR SITING WIND TURBINES RECOMMENDED FOR RELOCATION TO MINIMIZE POTENTIAL COLLISION-RELATED MORTALITY OF FOUR FOCAL RAPTOR SPECIES IN THE ALTAMONT PASS WIND RESOURCE AREA

Draft of 23 May 2010

Alameda County SRC

SECTION 1. INTRODUCTION

The Scientific Review Committee (SRC) for Alameda County's Altamont Pass Wind Resource Area (APWRA) avian mortality monitoring program has prepared the following guidelines to assist the wind power companies in the APWRA with re-siting of wind turbines recommended by the SRC for removal or relocation. Relocation or removal recommendations were made for the purpose of minimizing the potential for collision-related mortality of four focal raptor species in the APWRA.

As a result of the SRC's process of identifying hazardous turbines and exploring and evaluating the topographic, wind pattern, bird behavior, and turbine siting variables related to hazardous conditions, the SRC was also able to provide guidance on relocation of hazardous turbines to sites that pose lower hazard to the four focal species.

These guidelines are intended to provide the wind companies with basic information regarding avian collision hazards associated with turbine siting in the APWRA that can be used to evaluate the risk of potential relocation sites as well as the possible increased risk created by non-operational turbines and removal of turbines. Initially released in August 2008, the guidelines were updated following the ratings of additional wind turbines by an SRC subcommittee composed of Jim Estep and Shawn Smallwood during March 2010.

Background

The Altamont Pass Wind Resource Area (APWRA) is known to cause hundreds of raptor fatalities per year due to wind turbine collisions alone (Howell and DiDonato 1991, Orloff and Flannery 1992, Smallwood and Thelander 2004, 2005, 2008, WEST, Inc. 2007). Because collision-related mortality of long-lived, protected species has continued largely unabated since the initial development of the APWRA, the recent renewal of the conditional use permits (CUPs) for the continued operation of existing, old-generation wind turbines proved controversial. To alleviate concerns expressed by members of the public and the resource agencies about the APWRA's impacts on raptors and other birds, the Alameda County Board of Supervisors introduced new requirements along with the renewal of the CUPs.

The Alameda County Board of Supervisors issued a resolution on 22 September 2005, which required the shutdown or relocation of Tier 1 and 2 turbines[1] according to a schedule (Exhibit G-2), as well as the removal of all derelict and non-operating turbines[2] by 22 September 2006. Following a settlement agreement between the County of Alameda and the plaintiffs in a legal challenge of the CUP renewals under the California Environmental Quality Act, the Board of Supervisors amended the resolution and associated CUPs on 11 January 2007. This amendment applied to the wind companies agreeing to the settlement. It maintained the shutdown and relocation requirements, but expanded them to the removal of all Tier 3 turbines by 31 October 2008. It also maintained the requirement that all derelict and non-operating turbines be removed by 22 September 2006. The original and amended resolution included additional requirements, but the most relevant requirements for the foregoing document were the shutdowns and relocations of the most hazardous wind turbines and the removal of derelict and non-operating wind turbines.

The resolution by the Board of Supervisors also required the formation of a scientific review committee (SRC), which was to "investigate, monitor and evaluate the effectiveness of the [Avian Wildlife Protection] Program" (Exhibits G-1 and G-2). After receiving input from the Permittees, the monitoring team, and state-sponsored research, the SRC was also to "recommend adjustments [to the Program], and design and implementation of alternative strategies" (Exhibits G-1 and G-2). The original resolution (Exhibit G-2) charged the SRC with recommending management actions aimed at achieving "progressive and substantial reductions in avian mortality and injuries," whereas the amended resolution (Exhibit G-1) charged the SRC with recommending management actions aimed at achieving a 50% reduction in wind turbine-related mortality of golden eagles, red-tailed hawks, American kestrels and burrowing owls, while also minimizing losses to wind power generation. Thus, the goals were not exactly the same for settling and non-settling companies, but the SRC's role was consistent in terms of recommending management actions to reduce bird mortality.

[1] Most hazardous wind turbines, based on a classification of hazard level developed by Smallwood and Spiegel (2005a,b,c).

[2] The CUPs did not explicitly define the term "derelict," but its use followed from language used in Smallwood and Thelander (2004), who intended it to mean towers lacking turbines or supporting non-functional turbines. Indeed, the CUPs address derelict and "non-operational turbines" in the same phrase. Confusion over the term emerged when the companies said that many of the towers without turbines or with non-functional turbines are simply "vacant," which means they are awaiting repair or new turbines to be mounted on them and placed back into service. Regardless of whether a tower is *vacant* or *derelict*, it poses an increased hazard to raptors, and is essentially the same thing until either the tower is removed or it supports a functional turbine.

As part of the SRC's investigation directed toward management recommendations, the full SRC visited the APWRA on 29 November – 1 December and on 10 December 2007. An SRC subcommittee consisting of Jim Estep and Shawn Smallwood visited the APWRA to rate more wind turbines during March 2010. The SRC relied on available research reports and their combined expertise to review the configuration and environmental setting of wind turbines at sites associated with large numbers of fatalities relative to the majority of the APWRA, and they identified candidate wind turbines that could be deemed relatively more hazardous to raptors (see SRC documents P67, P68, and P69). The SRC evaluated and ranked wind turbines according to their hazard to raptors, with the intent to consider mitigation actions involving permanent shut down and removal of the most dangerous turbines. The SRC ultimately recommended removal of high-ranking wind turbines, as well as removals of additional wind turbines if the wind companies' decided to shutdown all old-generation wind turbines for only part of the winter instead of the SRC's recommended four months over the winter. The SRC specifically recommended the following:

- Remove all towers and turbines rated 8 through 10 (SRC document P69);
- If the winter shutdown is not extended to at least 3 full search rotations (anticipated to be about 3 months), then remove towers and turbines rated 7 and 7.5; and,
- The SRC evaluates turbines and towers not previously evaluated for hazard and removal.

These recommendations were revised slightly based on the March 2010 visit by the subcommittee (see below). The SRC's rankings were later assessed by comparing mortality estimates from recent fatality monitoring data, and were found to contribute disproportionately to the mortality of golden eagles, red-tailed hawks and American kestrels (Smallwood 2008, 2010).

During the field trip, the SRC noticed many derelict or vacant wind towers which sometimes create vertical or lateral gaps[3] that raptors may incorrectly perceive as safer to fly through (SRC document P67). Also, raptors perch disproportionately more often on derelict or vacant towers, or on towers of non-operating turbines (Smallwood and Thelander 2004, 2005; Smallwood et al. 2009), which often places these raptors in close proximity to adjacent, functional turbines. Whenever derelict or vacant towers lure raptors closer to functional wind turbines, whether for

[3] Gaps refer to spacing between functional turbines that are wider than the average spacing along the row of turbines as originally sited or as has emerged due to one or more turbines being removed or becoming non-functional.

crossing perceived gaps or for perching, there is the chance of conspecific[4] or inter-specific interactions that could distract the raptors, leading to collisions.[5]

During the field trips, the SRC observed multiple opportunities for relocating wind turbines from relatively hazardous to safer locations, or to locations where overall safety to birds could be increased. The SRC concluded that the companies could likely relocate at least some of the wind turbines the SRC recommended for removal, with relocation sites subject to SRC approval. In order to provide a common understanding of the safest relocation sites and to facilitate the identification of these sites by wind energy companies, the SRC developed guidelines characterizing preferred relocation sites as well as sites to be avoided (see Section 3). In addition to the need for developing written guidelines, the SRC recognized that consultation with the companies' engineers may be needed to identify opportunities for relocation, as well as technical restrictions.

The primary goal of these guidelines and of subsequent deliberations between the companies and the SRC is to relocate turbines from more hazardous to less hazardous sites and remedy existing hazardous conditions due to vacant or derelict sites, ultimately contributing to a 50% reduction in raptor mortality in the APWRA.

SECTION 2. DESCRIPTION OF SITING FACTORS

The SRC's guidelines are based largely on published and unpublished results of research in the APWRA and personal observations and experience of SRC members. Some of the most influential experience was obtained during the SRC's four-day field trip, when the SRC was able to view the cumulative distribution of fatalities recorded by the Wildlife Reporting and Response system (WRRS)[6] and scientific research studies (Orloff and Flannery 1992, Smallwood and Thelander 2004, and unpublished, on-going monitoring data). The SRC related the distribution of these fatalities to topography and wind patterns, as well as to the arrangement of wind turbines. Research reports that identified factors associated with fatalities included Orloff and

[4] "Conspecific" refers to individual(s) of the same species.

[5] Smaller birds often harass raptors while they are flying, causing them to defend themselves while fleeing the harassment. Larger-bodied raptors sometimes attack smaller-bodied raptors, in predatory-prey relationships. Also, raptors often chase individuals of the same species to defend territories or foraging space. While raptors are flying they often flush perched raptors, because the perched bird is at a strategic disadvantage. Flying raptors also sometimes change their flight direction to avoid another perched raptor, and if close by, the flying raptor will keep watch of the perched raptor. All of these types of interactions are distracting to a flying bird, and can lead to collisions.

[6] WRRS is the self-monitoring program used by the wind companies.

Flannery (1992, 1996), Smallwood and Neher (2004), Smallwood and Thelander (2004, 2005), Smallwood et al. (2007), and Smallwood et al. (2009). The biological resources section of the repowering EIR (Alameda County 1998) also contributed to the SRC's knowledge of factors associated with raptor fatalities.

The causal factors of raptor collisions with wind turbines appear to be interaction effects of raptor flight patterns with topography, wind patterns, and the arrangement of functional and non-functional wind turbines/towers. Flight patterns associated with foraging, e.g., hovering and kiting, have been most often linked to collisions, largely because most of the eye-witness accounts of red-tailed hawk and American kestrel collisions involved these behaviors. Raptors often forage where they can utilize slope-accelerated winds[7] to power their flights and to hold their positions while scanning for prey items. The spatial patterns of golden eagle fatalities among wind turbines also appear consistent with contour hunting by golden eagles.[8] Clusters of fatalities also occur where raptors have often been viewed foraging and crossing the terrain, including relatively low-lying areas, such as through canyons, ravines, saddles in and between ridges, and at the base of shoulders of hills or ridges. Steeper slopes are also associated with more fatalities.

Raptor fatalities at wind turbines have also been associated with wind turbines at the ends of turbine rows. Behavior data suggest at least some raptor species may perceive both the individual wind turbine and the row of wind turbines as units to be avoided, prompting raptors to more often attempt to fly around the entire turbine row. More frequent flights by the end-of-row turbine may be one reason why these turbines are often associated with more fatalities. Another reason for the association would be the frequent occurrence of end-of-row turbines at locations lower on the slopes, or on steeper slopes, where raptors often fly or where they may have less control of their flights. More recently, the wind companies have left derelict towers at the ends of rows as an alternative to perch-free flight diverters recommended by Richard Curry Associates (1997) and Smallwood and Thelander (2005a,b), and these derelict towers may have increased fatalities at the last functional turbine in the row, next to the derelict tower, because the end-of-row derelict towers likely attract raptors looking for perch sites. Wind turbines next to gaps in turbine strings have also sometimes been associated with fatalities, perhaps because raptors misperceive gaps created by vacant tower pads[9] or derelict or vacant towers as safe

[7] Slope-accelerated winds are winds that are accelerated due to being pushed up the slope or through a ravine or canyon. Typically, winds are strongest at the top of the slope facing the wind, or where the slope facing the wind breaks over to a gentler gradient.

[8] Contour hunting is flying relatively close to the terrain, quickly adjusting flight surfaces in complex winds to maintain a similar distance from the ground while traversing multiple slopes. The strategy is intended to surprise prey items by suddenly appearing from over a narrow ridgeline or from around the corner.

[9] "Vacant tower pads" are turbine addresses lacking turbines or towers.

crossing points through the turbine row. Also, raptor behavior and fatality data have indicated an avoidance of denser turbine fields[10] (Smallwood and Thelander 2004, 2005; Smallwood, Lee Neher, Doug Bell, Joe DiDonato, Brian Karas, Sara Snyder, and Sal Lopez, unpublished data in submitted final report to Public Interest Energy Research Program), and greater mortality at more isolated turbines and at turbines at the edges of the wind farm or local turbine fields (Smallwood and Thelander 2004, 2005).

Additional fatality associations have been documented or suspected, including at wind turbines nearby rock piles, trees, ponds, transmission towers, litter control fences outside the perimeter of the landfill, and electric distribution poles. Some of these features might attract perching raptors, thereby placing perched raptors near functional wind turbines. As suggested earlier, perched raptors can interact with other animals. They can attack prey items from the perch, they can change flight paths of conspecifics or other smaller-bodied raptor species, and they can be flushed by other raptors. These types of interactions can distract birds, leading to collisions with wind turbines.

SECTION 3. SITING GUIDELINES

The siting guidelines apply primarily to wind turbine relocations. *Relocation* refers to turbines that have been recommended for removal due to hazardous conditions for which these guidelines can assist the wind companies in selecting a less hazardous relocation site. The guidelines may also apply to turbines that are removed or become derelict in the future, causing hazardous conditions that can be created by newly vacant or derelict sites. The guidelines may also be useful for siting new wind turbines as part of repowering.[11] However, these guidelines apply specifically to wind turbine 'addresses,' which are the locations permitted for wind turbine operations.

These guidelines, which are not intended for any other locations that were not permitted with an existing wind turbine address as of January 2006, list the features of preferred sites or settings into which wind turbines can be relocated. The guidelines also list features of sites or settings into which wind turbine relocations are discouraged. The guidelines are deliberately not ranked, because the SRC recognizes that each of the thousands of wind turbine addresses in the APWRA have unique combinations of conditions that can mitigate or enhance the hazard associated with individual factors. As the SRC continues its efforts to understand the conditions under which a turbine location presents excessive hazards to birds, then there may be additional settings or

[10] A turbine field is a group of turbines, sometimes but not always of the same model, that are relatively separated from other groups of turbines. An example would be the AES-owned Micon 65-KW turbines near Mountain House.

[11] Repowering is the replacement of existing, old-generation wind turbines with new, modern turbines.

situations not covered in these guidelines that the SRC later determines to be too hazardous for a wind turbine relocation.

Preferred Relocation Sites or Settings

a. Hill peaks, ridge crests, and relatively even terrain to fill gaps due to presently derelict or vacant towers, or empty pads (Photos 1 and 2);

b. Wind walls[12] where vacant or derelict towers create vertical or lateral gaps between functional turbines (Photo 3);

c. Into turbine rows that already occur in high density, i.e., to increase the density of an already dense turbine field (Photo 4);

d. Interior to the turbine row to fill small gaps created by the removal of a turbine or where vacant towers occur as potential perch sites, except in cases where a gap in the interior of a turbine row is large enough to provide a safe flight path, and where relocating a turbine into that gap would result in a smaller unsafe gap (Photos 5 and 6);

e. Slopes that are leeward to one or two prevailing wind directions or that are set back from slopes facing prevailing wind directions (Photo 7); and,

f. Interior to a turbine field, unless the location is within a ridge saddle or on a steep slope, or unless other factors about the site outweigh the hazard reduction that may be achieved by the site's interior location.

Discouraged Relocation Sites or Settings

a. Sites classified as Tier 1, Tier 2, or Tier 3 according to any of the Tier classifications developed by Smallwood and Spiegel (2005a,b,c), unless the proposed new turbine arrangement creates a situation where a relocation to one of these addresses would improve safety to birds;

b. Ends of turbine rows, especially where the end of the row is at the edge of a steep slope, on a steep slope, or in a saddle, ravine, or canyon (Photo 8);

[12] Wind walls are rows of wind turbines mounted on towers at two heights above the ground, so that turbines on shorter towers are immediately in front of turbines on taller towers.

c. Where raptor fatalities have been reported previously, or potential flight paths have been identified such as through excessively long rows, unless the conditions associated with greater hazard have since changed so that the particular locations are no longer as hazardous;

d. Saddles of ridges or saddles between ridges, and especially where saddles form the apex of ravines that face a prevailing wind direction (Photos 9 through 13) or especially where these types of slope conditions occur in combination with nearby electric distribution lines (Photo 14) or other tall structures;

e. On benches of hill slopes or ridges, or just at the base of shoulders of hills, i.e., in locations of sudden elevation changes, where a raptor more often decides to fly while contouring around the slope (Photos 15, 16, and 20);

f. On or immediately adjacent to steep slopes (Photo 17);

g. At the edges of turbine fields or at the edge of the wind farm, unless the relocation somehow reduces the hazard posed by other nearby wind turbines occurring at the edge;

h. Next to artificial rock piles or natural rock formations, so long as addresses of equal or lesser hazard are available where there are no rock piles or rock formations within 100 meters (Photo 18);

i. Next to streams or ponds (Photo 13);

j. Next to transmission towers, electric distribution poles, or litter control fence around the landfill (Photos 19 and 20);

k. Where slope-accelerated winds would likely position a raptor at the height domain of the rotor plain of functional turbines (Photo 21), including where lips in the slope can locally accelerate winds used by hovering or kiting American kestrels (Photo 22);

l. Gaps in strings that are large enough for birds to safely cross (Photo 223);

m. Locations remote from other functional wind turbines, or more isolated locations; and,
n. Where turbine rows suddenly change directions (Photo 24).

Photo 1. The two derelict towers to either side of this functional turbine on the ridge crest should either be removed or put back into service. If the derelict towers are removed, then the interior functional turbine should also be removed.

Photo 2. A derelict tower interior to the turbine row and at the top of the hill would be a relatively safer relocation site.

Photo 3. Turbines missing from tall towers in wind walls (e.g., red highlight at left) can create vertical and lateral gaps in turbine operations, which might be misperceived by raptors as safe perches or fly-through locations. Turbines removed from shorter towers, such as the functional one highlighted on the right, can also create vertical and lateral gaps.

Photo 4. Where possible, turbine relocations should be directed to the interior aspect of relatively denser turbine fields.

Photo 5. Turbine relocations would be relatively safer at towers interior to the turbine rows and atop a hill or ridge.

Photo 6. Turbine relocations would be relatively safer at towers interior to the turbine rows and atop a hill or ridge.

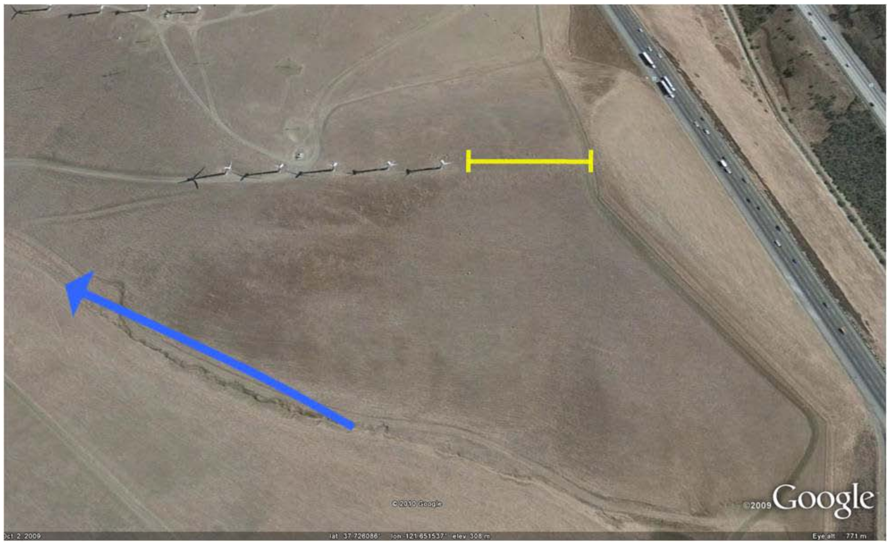


Photo 7. Turbine relocations would be relatively safer where they are set back (see yellow bar) from steep slopes facing prevailing wind directions (blue arrow).

Photo 8. Turbines should not be relocated to ends of turbine rows, especially where the towers are next to steep slopes or ravines, such as the derelict tower on the right side of the turbine row in the foreground.

Photo 9. Turbines should be relocated to hill peaks or ridge crests (e.g., green highlight), but not to saddles in the ridge (red highlight).

Photo 10. Turbines should not be relocated to ridge saddles, especially in a situation like above, where trees and rock formations occur nearby.

Photo 11. Turbines should not be relocated to ridge saddles, especially where declivity winds from a prevailing wind direction funnel into the saddle, as in the red zone at the right side of this photo.

Photo 12. Wind turbines should not be relocated to saddles formed by the meeting of two ridges.

Photo 13. Wind turbines should not be relocated to saddles or to the lower aspects of a ravine or canyon, especially not next to a pond or stream.

Photo 14. Slope-accelerated winds can be hazardous where wind turbines are sited, and especially if electric distribution lines or other tall structure provide American kestrels or other raptors additional perching opportunities near the wind turbines.

Photo 15. Wind turbines should not be relocated to shoulders of the ridge or hill, or where the slope suddenly changes, such as seen in this photo.


Photo 16. Wind turbines should not be relocated to shoulders of the ridge or hill, or where the slope suddenly changes, such as seen in this photo. This is especially true for long turbine rows like this one, where opportunities for raptors to fly through gaps are absent.


Photo 17. Derelict towers should not be put back into service where they abut steep slopes or ravines.

Photo 18. Derelict towers should not be put back into service where they occur near rock piles or trees or other structures that may be attractive for perching or hunting. In the photo above, rock piles appear just this side of the derelict tower, which should be removed. Note, however, that removing the derelict tower would result in a potentially hazardous gap in the turbine string, suggesting the importance of fully evaluating all hazardous conditions before a relocation or removal decision is made.

Photo 19. Avoid relocating wind turbines next to transmission towers or other perch sites.

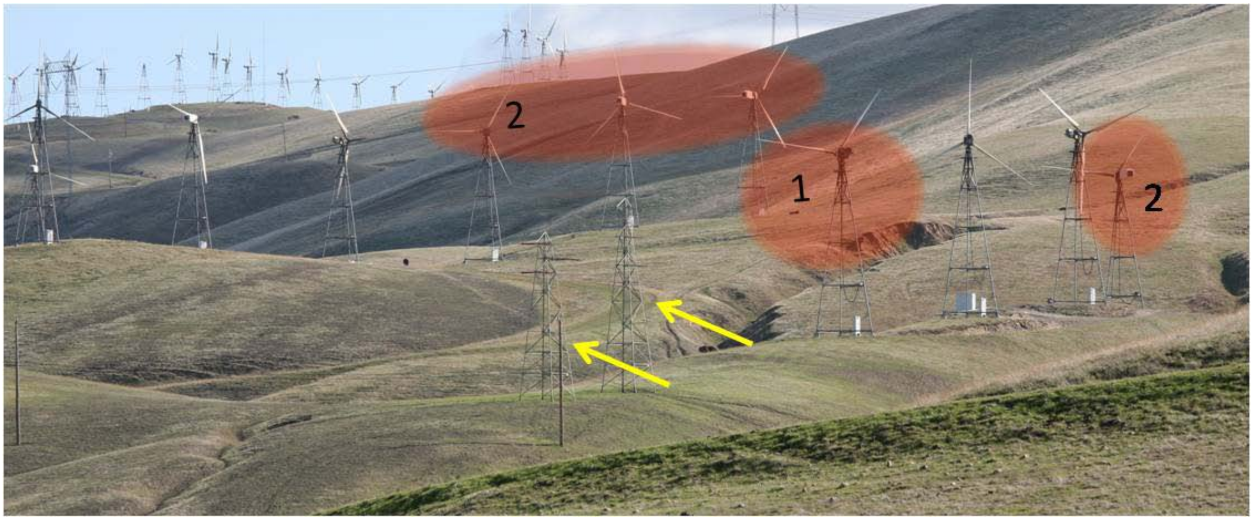


Photo 20. Avoid relocating wind turbines near transmission towers (1) or other perch sites, or to shoulders of the hill (2).

Photo 21. Wind turbines should not be relocated to locations on the slope where downslope hill morphology pushes the wind toward these locations from two different prevailing wind directions. In this photo, the red highlight identifies a portion of the air space where winds will be pushed to greater speeds by winds blowing from the northwest, west, southwest, and south.

Photo 22. Lips formed in the slope either naturally or due to grading for roads or wind turbine laydown areas might also encourage American kestrels to hover or kite in moderate and strong winds in front of wind turbines.

Photo 23. Wind turbines should not be relocated to towers within otherwise wide gaps between other turbines, such as seen above.

Photo 24. Wind turbines can be more hazardous where turbine rows zig-zag in direction (yellow arrow), especially where slope-accelerated winds (blue arrows) intersect the change in direction of the turbine row.

SECTION 4. IMMEDIATE NEXT STEPS

The SRC proposes the following steps for developing a near-term relocation plan:

1. The companies decide how many and which of the wind turbines they wish to relocate rather than remove, following the SRC's recommended removals of identified wind turbines;

2. The companies decide where they would prefer to relocate the removed turbines, and then provide a map of these locations to the SRC, as well as all current locations of potential other relocation addresses (empty pads, and derelict or vacant towers);

3. The SRC reviews the proposed relocation sites and considers other identified addresses, if needed;

4. The companies' engineers inform the SRC of which of their suggested alternative relocation addresses are infeasible and why; and

5. The SRC recommends a final relocation plan following steps 1-4, and which is directed toward immediate implementation.

The final relocation plan would be intended for immediate implementation for the purpose of achieving a 50% mortality reduction of raptors during the interim period preceding repowering of the Altamont Pass Wind Resource Area. Following the final relocation plan, the SRC recommends a relocation program for the future, during which the companies take the lead on using the SRC's relocation guidelines to evaluate the hazards associated with candidate relocations.

SECTION 5. RELOCATION PROGRAM FOR THE FUTURE

Given that wind turbine removal and relocations will continue throughout the time when wind turbines are operating in the Altamont Pass, and given that these removals and relocations will change the arrangement of wind turbines, there is a need to initiate a program to assess the collision hazards of wind turbines as they are removed or relocated. As wind turbines are removed or relocated, not only will the hazard status of the relocated turbines change, but so will the adjacent turbines from where the turbine was removed and to where the turbine will be relocated. The SRC recommends that the companies regularly update the SRC or a subcommittee of the SRC on planned or recent turbine removals and relocations. Alternatively, the companies could work with the SRC to train a company employee to assess the hazard status of turbines as removals and relocations are planned. These steps are necessary to ensure sustained confidence by the SRC in effectiveness of the turbine relocation management strategy outlined in these guidelines.

The final near-term relocation plan recommended by the SRC (see step 5 in Section 4) could identify turbine addresses to where the SRC feels it would be safer to relocate turbines during the subsequent relocation program. The SRC should meet and confer annually to identify new candidate relocation sites in order to remain current with changes in the APWRA. These new candidate addresses could be put into map form for implementation by the designated company employee or the SRC subcommittee.

SECTION 6. REFERENCES

Alameda County. 1998. Repowering a portion of the Altamont wind resource are Final Environmental Impact Report. State Clearinghouse No. 98022024, Sacramento, California.

Howell, J.A. and J.E. Didonato. 1991. Assessment of avian use and mortality related to wind turbine operations, Altamont Pass, Alameda and Contra Costa Counties, California, September 1998 through August 1989. Final report submitted to U.S. Windpower, Inc., Livermore, California.

Orloff, S., and A. Flannery. 1992. Wind turbine effects on avian activity, habitat use, and mortality in Altamont Pass and Solano County Wind Resource Areas: 1989-1991. Report to California Energy Commission, Sacramento, California.

Orloff, S., and A. Flannery. 1996. A continued examination of avian mortality in the Altamont Pass Wind Resource Area. Report to California Energy Commission, Sacramento, California.

Richard Curry Associates. 1997. Altamont Avian Plan: Status report to the U.S. Fish and Wildlife Service by the Consortium of Altamont Owners, December, 1997, Altamont Infrastructure Company, Livermore, California.

Smallwood, K. S. 2008. Assessment of Relocation/Removal of Altamont Pass Wind Turbines Rated as Hazardous by the Alameda County SRC. SRC document P-103. 10 pp.

Smallwood, K. S. 2010. Fatality Rates in the Altamont Pass Wind Resource Area 1998-2009. P145_Smallwood Fatality Monitoring Results 12-31-09.

Smallwood, K. S., and L. Neher. 2004. Repowering the APWRA: Forecasting and minimizing avian mortality without significant loss of power generation. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2005-005.

Smallwood, K. S. and L. Spiegel. 2005a. Assessment To Support An Adaptive Management Plan For The APWRA. Unpublished CEC staff report, January 19. 19 pp.

Smallwood, K. S. and L. Spiegel. 2005b. Partial Re-assessment of An Adaptive Management Plan For The APWRA. Unpublished CEC staff report, March 25. 48 pp.

Smallwood, K. S. and L. Spiegel. 2005c. Combining biology-based and policy-based tiers of priority for determining wind turbine relocation/shutdown to reduce bird fatalities in the APWRA. Unpublished CEC staff report, June 1. 9 pp.

Smallwood, K. S., C. G. Thelander. 2008. Bird Mortality in the Altamont Pass Wind Resource Area, California. Journal of Wildlife Management 72:215-223.

Smallwood, K. S. and C. Thelander. 2004. Developing methods to reduce bird mortality in the Altamont Pass Wind Resource Area. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. 500-01-019. Sacramento, California.

Smallwood, K. S. and C. Thelander. 2005. Bird mortality at the Altamont Pass Wind Resource Area, March 1998 – September 2001 Final Report. National Renewable Energy Laboratory, NREL/SR-500-36973. Golden, Colorado.

Smallwood, K. S., L. Rugge, and M. L. Morrison. 2009. Influence of Behavior on Bird Mortality in Wind Energy Developments: The Altamont Pass Wind Resource Area, California. Journal of Wildlife Management 73:1082-1098.

WEST, Inc. 2006. Wildlife monitoring at Altamont Pass, Winter 05 –early Fall 06: Preliminary draft results. Unpubl. report to Alameda County Scientific Review Committee, Alameda County Community Development Agency, Planning Department, 224 W. Winton Avenue, Rm. 111, Hayward, California. 55 pp.

Appendix G
Golden Hills Project Shadow Flicker Analysis

Shadow Flicker Analysis for the Golden Hills Wind Energy Facility Repowering Project

Prepared for

NextEra Energy Resources, LLC
700 Universe Boulevard
Juno Beach, FL 33408

June 2014

Prepared by

CH2MHILL

Contents

Acronyms and Abbreviations

DECC	Department of Energy & Climate Change
DEM	digital elevation model
Hz	Hertz
NextEra	NextEra Energy Resources, LLC
NRC	National Research Council
NWS	National Weather Service
Project	Golden Hills Wind Energy Facility Repowering Project
USGS	United States Geological Survey

SECTION 1
Introduction

Shadow flicker is the term used to refer to the alternating changes in light intensity that can occur at times when the rotating blades of wind turbines cast moving shadows on the ground or on structures. Shadow flicker occurs only when the wind turbines are operating during sunny conditions, and is most likely to occur early and late in the day when the sun is at a low angle in the sky. The intensity of shadow flicker is defined as "the difference or variation in brightness at a given location in the presence or absence of a shadow" (National Research Council [NRC], 2007). The intensity of the shadows cast by moving blades of wind turbines, and thus the perceived intensity of the flickering effect, is determined by the distance of the affected area from the turbine, with the most intense, distinct, and focused shadows occurring closest to the turbine (Department of Energy & Climate Change [DECC], 2009). The frequency of shadow flicker is a function of the number of blades making up the wind turbine rotor and rotor speed. Shadow flicker frequency is measured in terms of alternations per second, or Hertz (Hz).

There are two kinds of concerns that have been raised about shadow flicker in severe cases. One is that shadow flicker could have the potential to trigger epileptic seizures, and the other is that shadow flicker could become a source of annoyance to residents living near wind turbines. The Epilepsy Foundation notes that for a small minority (about 3 percent) of the 3 million people in the U.S. who are affected by epilepsy, there is a potential for epileptic seizures to be triggered by flashing light. These seizures have the potential to be triggered when the light flashes are in the range of 5 to 30 Hz. Because the frequency of the shadow flicker created by modern wind turbines is in the range of 0.6 to 1.0 Hz, the shadow flicker effects created by wind turbines do not have the potential to trigger epileptic seizures (Epilepsy Foundation, 2008).

The issue of annoyance is more subjective. There could be cases in which shadow flicker cast on residences located very close to wind turbines could be enough of a distraction for residents to be considered a nuisance.

SECTION 2

Method for Predicting Shadow Flicker Effects

CH2M HILL conducted the shadow flicker analysis for the proposed Golden Hills Wind Energy Facility Repowering Project (Project) with a conceptual study layout of 48 turbines using the SHADOW calculation module of the WindPRO software. WindPRO is a comprehensive software package developed for the design, development, and assessment of wind farm projects, as well as for the evaluation of energy, environmental, visual, electrical and economic effects of wind farm projects. To calculate shadow flicker levels at nearby residences and other structures, referred to as receptors, the WindPRO SHADOW calculation module takes into account the location of each receptor, the orientation of each side of the receptor, the location of each wind turbine, turbine hub height, turbine rotor width, turbine blade width, latitude and longitude, elevation data of the specific analysis area, and data on the sun's path through the sky on each day of the year (EMD International A/S [EMD], 2008). The locations of proposed wind turbines and three (3) receptors on the Sweet property were provided by NextEra Energy Resources, LLC (NextEra).

The analysis was restricted to evaluating the effects to the three (3) receptors located within 2,000 meters of the proposed turbines. The WindPRO SHADOW calculation model was run based on the assumption that the project would use GE 1.7 XLE turbines with a hub height of 80 meters (262 feet) and rotor diameter of 100 meters (328 feet).

The model domain extended 2,000 meters (1.2 miles) in each direction from the proposed wind turbine locations. According to German guidelines, flickering is only an issue when at least 20 percent of the sun is covered by the blade. WindPRO uses the blade width included in the turbine specifications that are entered into the SHADOW calculation module to calculate the maximum distance from the turbine where flickering will occur. Beyond this maximum distance, the turbine will not contribute to shadow flicker impacts. However, WindPRO uses a fixed maximum distance default of 2,000 meters for the purpose of setting up the SHADOW calculation module. WindPRO then calculates the actual distance, or "zone of impact", based on the blade width included. The shadow flicker model made use of topographic data to account for elevation differences and topographic features in the line of sight when turbines are viewed from a receptor. For the lands within the project area, 5-foot contour data were available and were used for the modeling.

As the sun approaches the horizon, sunshine becomes less intense, and therefore the shadow influence is reduced. To take this phenomenon into account, the standard practice in shadow flicker analysis is to calculate shadow flicker for only the times when the sun is at an angle of 3 or more degrees above the horizon (EMD, 2008; Osten and Pahlke, 1998). In conducting this analysis, the 3-degree threshold was observed.

As mentioned previously, the model was set to calculate shadow flicker only in the areas where 20 percent or more of the sun would be covered by the blade, creating detectable levels of flickering (EMD, 2008; Osten and Pahlke, 1998). The distance threshold defining the area within which 20 percent or more of the sun is covered is determined by the WindPRO program based on the width of the rotor blades. In this case, 985 meters (0.61 mile) was determined to be the maximum distance from the turbines within which shadows would fall that would entail coverage of 20 percent or more of the sun's surface.

The model focused on identifying the impacts on the three (3) receptors located within 985 meters of a proposed turbine, which is the calculated distance where the shadow flickering would be intense enough to be detectable and a potential source of concern. The three (3) receptors located within the calculated 985-meter zone of impact are included in Table 2. The orientation of each receptor was set on "greenhouse mode" for the model, which makes the very conservative assumption that the receptor has windows on all of its sides and, therefore, would be affected by shadow flicker that falls on any side of the structure; the "greenhouse mode" represents a worst-case scenario for each receptor.

Two runs of the WindPRO SHADOW calculation model were conducted. The first run provided a “worst case” assessment, and the second run, referred to as the “adjusted case assessment,” took into account a number of factors that, under actual operating conditions, would reduce the amount of shadow flicker impact created.

2.1 Worst Case Assessment

The worst case WindPRO model run assumed that:

- There would be clear skies from sunrise to sunset;
- The turbines would be operating constantly; and
- The rotor would always be oriented perpendicular to the receptor, meaning the rotor plane (or axis of rotation) would be perpendicular to a line drawn between the sun and the receptor.

These assumptions generate model results that represent a substantial overestimation of the daily minutes and total annual hours of shadow flicker. The overestimation occurs because these assumptions do not account for times when shadows would not be created because of overcast conditions, the rotors would not be turning due both to wind conditions and time taken out for maintenance, and the rotors would not be perpendicular to the receptors of concern, and would thus be incapable of casting shadows on them.

2.2 Adjusted Case Assessment

To develop a more accurate assessment of the shadow flicker effects the Project would create, the model was run a second time using available information regarding sunshine conditions in the general Project area.

2.2.1 Probability of Sunshine

To adjust the model to take into account the probable hours of sunshine in the Project area, cloud coverage data were necessary. Because detailed meteorological data, specifically data that would allow the extraction of convective mixing height and fraction of cloud cover per hour, were not available for the Project area itself, research was conducted to locate a nearby meteorological station that collects the required data. The research revealed that the nearest station where the data are collected is located at the Livermore Airport, which is approximately 9 miles west of the Project’s western edge.

To calculate the monthly probabilities of sunshine, hourly National Weather Service (NWS) meteorological data collected from the Livermore Airport monitoring station (WBAN #23285) were used for the analysis. Five years of hourly observations between January 1, 2008 and December 31, 2012 were obtained from the NWS automated surface observation system (ASOS). The data at the Livermore Airport are 96.5-percent complete for the 5-year period and is the nearest complete data available which represents the climate conditions to the Project area. The second closest NWS meteorological station to the Project site would be from the Stockton Airport, which is located approximately 25 miles northeast from the Project.

The AERMET meteorological data processor, developed by the U.S. Environmental Protection Agency to read and extract parameters from NWS data and process for the purposes of air dispersion modeling, was used to calculate the monthly probabilities of sunshine. For this analysis, AERMET (Version 14134) extracted the fraction of cloud cover for each hour and calculated the convective mixing height based on the station latitude and time zone. The total daytime hours for each month were determined based on the convective mixing height, which is generated only during daytime hours. For each hour, a cloud cover fraction of seven tenths and below was considered sunny. The total number of sunny hours (or sun hours) was divided by the total number of daytime hours in the month (or possible sun hours) to determine each month’s sunshine probability. The monthly sunshine probabilities that were derived through this analysis and were used in calculating the project’s likely shadow flicker effects are summarized in Table 1.

TABLE 1
Average Sunshine Probability Per Month (Recorded Sun Hours/Possible Sun Hours) for Livermore Airport, California

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.66	0.62	0.67	0.79	0.80	0.88	0.92	0.92	0.93	0.83	0.73	0.64

2.2.2 Predicted Turbine Operation and Rotation

In order to base the adjusted case assessment on a more accurate estimate of the numbers of hours that the turbines would be in operation, data was collected on “mechanical turbine availability”. Mechanical turbine availability is the percentage of time the turbines would be available to generate electricity versus the percentage of time that they would need to be off-line for maintenance purposes. Data was also collected on wind availability, to provide a basis for determining the percentage of time when wind speeds would be high enough to spin the blades, but low enough to allow the turbines to operate safely. The wind availability was collected using only the data available when the net capacity factor on the long-term time series was greater than five (5) percent.

This predicted number of operational hours was calculated using the equation below, which incorporates an expected mechanical turbine availability of 97.07 percent and a wind availability of 93.84 percent:

- (Total hours per year)*(mechanical turbine availability)*(wind availability) = predicted annual operational hours
- (8,760 hours)*(0.9707)*(0.9384) = 7,979.5 annual operational hours
- The 7,979.5 annual operational hours equates to the turbines operating at 91 percent per year.

2.2.3 Evaluation of the Adjusted Case Assessment Results

The adjusted case assessment assumes that the sun would be unobstructed by clouds long enough to have the potential to permit shadow flicker effects to be created anywhere from 55 percent to 95 percent of the time during daylight hours on a monthly basis, averaging out to approximately 75 percent of the time when considered on an annual basis. The adjusted case assessment also assumes that the turbines would have the potential to operate 91 percent of the time during daylight hours (7,979.5 operation hours per year, compared to the 8,760 hours assumed by the worst case assessment). This adjustment from the worst case assessment allows the model to generate predictions of the number of hours of shadow flicker experienced at receptors that are more accurate in respect to the actual shadow flicker conditions that would be experienced, as opposed to the hours of shadow flicker predicted by the worst case assessment. However, the results of the adjusted case assessment still represent an overestimation of total hours of shadow flicker effect.

A key variable that was not taken into account in the adjusted case modeling is wind direction. Wind direction determines how much of the time the blades are turned in a direction that would cast shadows on the receptors being evaluated. The data required to permit this variable to be factored into the modeling were not available. If data had been available for analysis, some of the estimated hours and minutes of the predicted shadow flicker exposure may have been lower than the numbers calculated using the adjustments related to cloud cover, mechanical turbine availability, and wind availability (or speed).

2.2.4 Additional Factors

Other factors that could also affect the total amount of predicted shadow flicker, but were not able to be taken into account in the adjusted case assessment due to uncertainty or unavailable data include the following:

- Presence of haze or particulate matter in the air could reduce the intensity of light and reduce distances at which shadows can be cast.
- Shadows created by portions of the rotor closest to the hub are more intense and can be perceived at a longer distance than shadows created by blade tips. The WindPRO model treats shadows created by all parts of the blade as if they were shadows created by blade portions closest to the hub. As a result, this could overstate distances at which shadows can be seen and might also overstate shadow effects.
- Potential structures and vegetation located between receptors and the turbines, which would block shadows created by the rotating turbine blades and thus prevent shadow flicker from occurring at receptors.
- The model assumes that the receptors are in the “greenhouse mode,” in which the receptor is assumed to be all windows – a worst case scenario. Receptors normally have much less window than wall space on any given side.

Therefore, in reviewing and interpreting the results of the adjusted case assessment, it is important to note that these results are also upper limit projections, and that the actual hours and minutes of shadow flicker predicted to be experienced at receptors in proximity to the project are likely to be substantially lower than those that the modeling results indicate.

SECTION 3

Analysis Results

The shadow flicker modeling results for the three (3) receptors located on the Sweet property and within the 985-meter zone of impact, meaning 985 meters from a proposed turbine, are presented in Table 2. The three (3) receptors are identified with an ID that corresponds to the receptor locations labeled in Figure 1. For each receptor, the table presents the modeling results in terms of the following conditions:

- The total potential shadow flicker during all daylight hours (in hours per year) based on the adjusted case calculations which take overcast conditions into account;
- The predicted maximum minutes per day of shadow flicker. These values are only based on the worst case assessment due to limitations of the WindPRO software, and therefore do not take overcast conditions into account.
- Identification of the turbines that would contribute to shadow flicker effects at that receptor
- The distance to the nearest turbine that contributes to shadow flicker effects at the receptor
- The months in which shadow flicker occurs

Table 3 provides a list of the all 48 turbines and indicates the total number of hours of shadow flicker experienced at receptors that would be generated by that particular turbine. Only three (3) of the 48 turbines are predicted to generate shadow flicker effects. All turbines are identified with a number that corresponds to the turbine locations labeled in Figure 1.

The results of the modeling are also communicated in graphic form in Figure 1. The information provided on this figure consists of butterfly diagrams that indicate the distribution of annual hours of potential shadow flicker effect around each turbine, and the locations of the receptors in the project area in relationship to these shadow flicker patterns.

The modeling results indicate that all three (3) receptors located on the Sweet property and within 985 meters of the proposed turbines have the potential to experience shadow flicker effects. A review of the annual shadow flicker exposure data indicates that these three (3) receptors could experience from 33 minutes up to approximately 13 hours per year of shadow flickering. On a daily basis, the maximum shadow flicker effects for the three (3) receptors have the potential to last between 18 and 76 minutes (or 1 hour and 16 minutes).

Receptor H33 could likely experience minimal shadow flicker effects. There will only be a total of approximately 30 minutes of shadow flicker per year, and on the day of maximum shadow flicker exposure, the duration of the flickering would be no more than 18 minutes.

Receptor H35 could experience an approximate total of up to 10 hours and 45 minutes of shadow flicker effects over the course of one year. The flickering would occur during the months of April, May, June, July, and August. On the day of maximum shadow flicker exposure, the flickering would occur for no more than one hour and 9 minutes.

Receptor H34 could experience an approximate total of up to 13 hours and 16 minutes of shadow flicker effects over one year. The flickering would occur during the months of April, May, June, July, and August. On the day of maximum shadow flicker exposure, the flickering would occur for no more than one hour and 16 minutes.

Although the adjusted case assessment results took a real world factor into account (overcast conditions and operational hours), there are many attenuating variables that could lessen the amount of shadow flicker that are not accounted for in the model; therefore, the data generated by the adjusted case assessment represent an overestimation of the likely potential hours and minutes of shadow flicker effect. The actual levels of shadow flicker exposure at receptors would likely be lower than the modeling results indicated in Table 2. This is due in part to the fact that the WindPRO calculations assumed the turbines would be operating continuously, which is unrealistic during low or no-wind conditions.

In evaluating the implications of the shadow flicker impacts identified in Table, it is important to note that the impacts identified are likely to be upper limit predictions of the actual shadow flickering that would occur.

TABLE 2

Modeled Shadow Flicker Impacts on Receptors H33, H34, and H35

Receptor ID	Property Owner	Total Potential Shadow Flicker Adjusted for Overcast Conditions (hrs:min per year)	Maximum Daily Shadow Flicker (hrs:min per day)*	Turbines Contributing to Shadow Flicker	Distance to Nearest Turbine (meters [feet])	Months that Shadow Flicker Occurs
H33	Sweet	0:33	0:18	T-11	550 (1,803)	Mar, Sep, Oct
H34	Sweet	13:16	1:16	T-13, T-20	522 (1,713)	Apr, May, Jun, Jul, Aug
H35	Sweet	10:45	1:09	T-13, T-20	549 (1,802)	Apr, May, Jun, Jul, Aug

*WindPRO is unable to adjust the maximum daily shadow flicker effects for overcast conditions or operational hours.

Note: The data included in this analysis uses aggregated meteorological data and is based on a conservative modeling approach. Therefore, it is important to note that the results presented in this analysis would likely not be consistently observed on an annual basis, and that actual hours of shadow flicker would potentially vary.

TABLE 3
Potential Shadow Flicker per Wind Turbine

Turbine ID	Total Potential Shadow Flicker Adjusted for Overcast Conditions (hrs:min per year)
T-1	0:00
T-2	0:00
T-3	0:00
T-4	0:00
T-5	0:00
T-6	0:00
T-7	0:00
T-8	0:00
T-9	0:00
T-10	0:00
T-11	0:32
T-12	0:00
T-13	9:21
T-14	0:00
T-15	0:00
T-16	0:00
T-17	0:00
T-18	0:00
T-19	0:00
T-20	6:26
T-21	0:00
T-22	0:00
T-23	0:00
T-24	0:00
T-25	0:00
T-26	0:00
T-27	0:00
T-28	0:00
T-29	0:00
T-30	0:00
T-31	0:00
T-32	0:00
T-33	0:00
T-34	0:00
T-35	0:00
T-36	0:00
T-37	0:00
T-38	0:00
T-39	0:00
T-40	0:00
T-41	0:00

TABLE 3
Potential Shadow Flicker per Wind Turbine

Turbine ID	Total Potential Shadow Flicker Adjusted for Overcast Conditions (hrs:min per year)
T-42	0:00
T-43	0:00
T-44	0:00
T-45	0:00
T-46	0:00
T-47	0:00
T-48	0:00
TOTAL	**16:19**

Note: All wind turbines that were included in the model are listed in this table: turbines that are predicted to potentially cause shadow flicker, along with turbines that are not predicted to cause shadow flicker at the three (3) receptors located on the Sweet property and within 2,000 meters.

SECTION 4
References

Department of Energy & Climate Change (DECC). 2009. *Onshore Wind: Shadow Flicker*. Available at website: http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/planning/on_off_wind/shadow_flicker/shadow_flicker.aspx. Accessed on November 19, 2009.

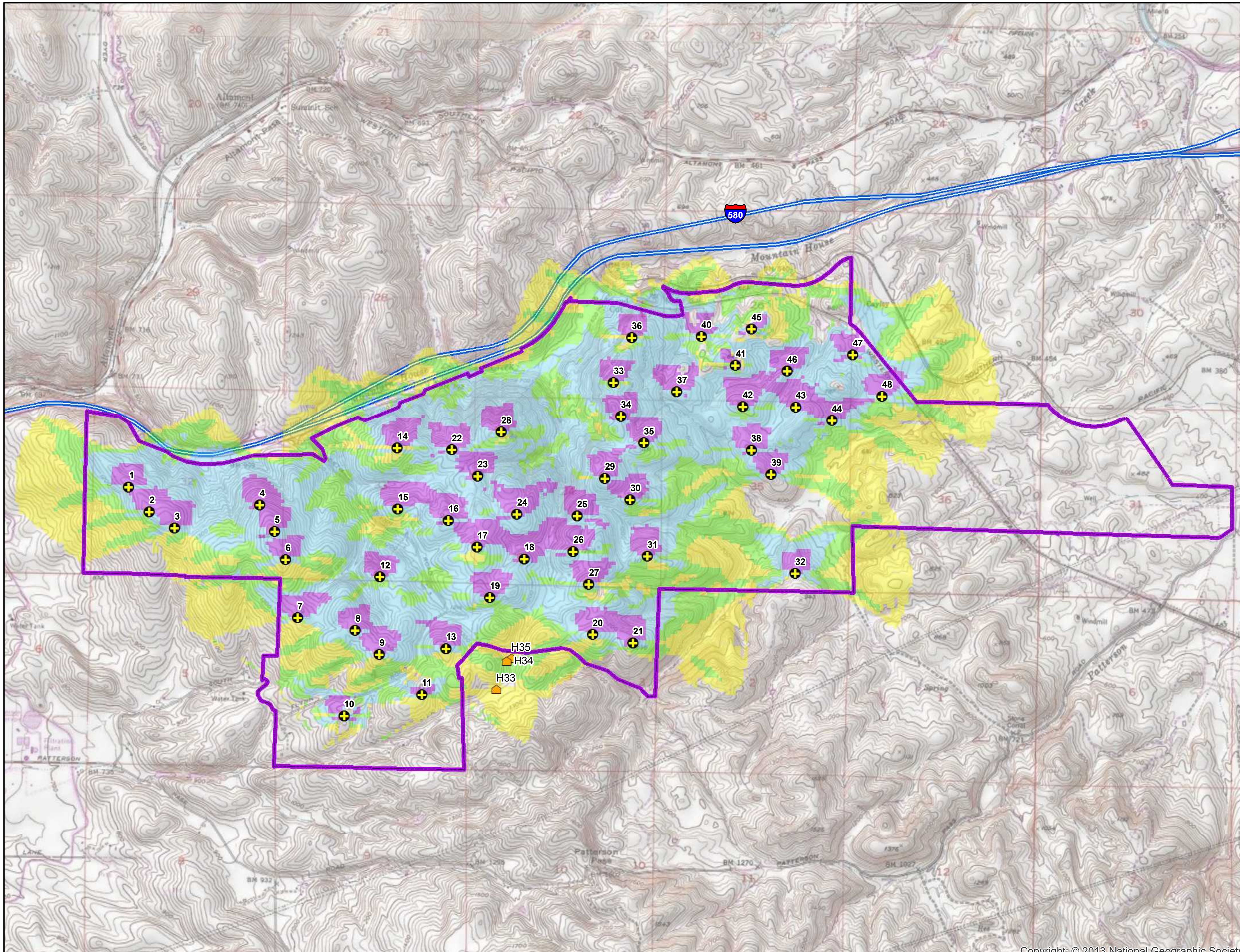
EMD International A/S (EMD). 2008. *WindPRO 2.6 User's Guide*. First Edition. Pages 8-9 and 254-263. January.

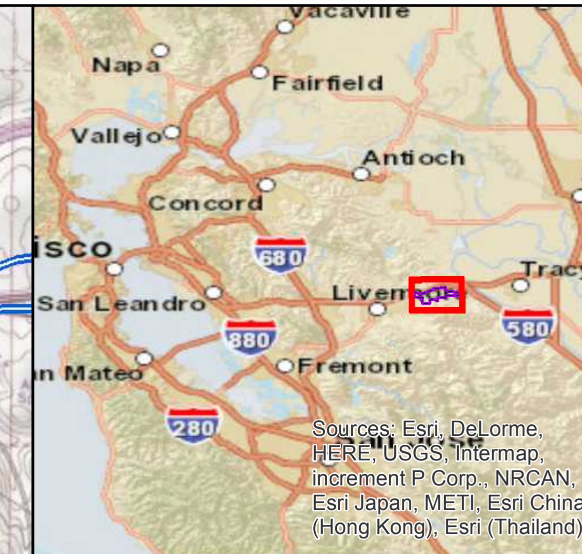
Epilepsy Foundation. 2008. *Photosensitivity and Epilepsy*. Available at website: http://www.epilepsyfoundation.org/about/photosensitivity/index.cfm. Accessed on June 24, 2008.

National Research Council (NRC). 2007. *Environmental Impacts of Wind-Energy Projects.* National Academies Press.

Osten, Tjado, and Thomas Pahlke (Osten and Pahlke). 1998. Schattenwurf von windenergieanlagen: wird die gebraeuschabstrahlung der MW-Anlagen in den Schatten gestellt? (Shadow impact on the surrounding of wind turbines). *DEWI Magazin*, Nr. 13, August 1998. Pp 6-12.

Figure 1
Shadow Flicker Results





LEGEND

- Golden Hills Project Boundary
- Proposed Turbine Locations
- Receptors on the Sweet Property

Total Potential Hours of Shadow Flicker based on the Adjusted Case Assessment

Hours per Year

- 0.01- 10
- 10 - 30
- 30 - 100
- 100+

0 2,500
Feet

FIGURE 1
Shadow Flicker Results

Golden Hills Wind Energy Facility Repowering Project