Avian Conservation Strategy

Panoche Valley Solar Facility
San Benito County, California

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Table of Contents

1.0 INTRODUCTION 1

1.1 Purpose of the Avian Conservation Strategy 1
1.2 Regulatory Framework 1
1.2.1 Federal Endangered Species Act 2
1.2.2 Bald and Golden Eagle Protection Act 2
1.2.3 Migratory Bird Treaty Act 3
1.2.4 California Endangered Species Act and Other State Fish and Game Codes 3
1.3 Corporate Policy 3

2.0 PROJECT INFORMATION 4

2.1 Project Location 4
2.2 Project Description 4

3.0 EXISTING CONDITIONS 5

3.1 Project Footprint 5
3.2 Conservation Lands 6
3.2.1 Valley Floor Conservation Lands 6
3.2.2 Valadeao Ranch Conservation Lands 6
3.2.3 Silver Creek Ranch Conservation Lands 8
3.3 Literature Review and Initial Site Assessment (Tiers 1 and 2) 8
3.3.1 Special Status Avian Species 9
3.3.2 Important Bird Area 10
3.3.3 Christmas Bird Count Data 10
3.4 Previous Avian Surveys, Methods, and Results (Tiers 2 and 3) 10
3.4.1 Golden Eagle 11
3.4.2 Miscellaneous Observations 18

4.0 AVIAN IMPACT ASSESSMENT (TIER 3) 18

4.1 Lighting 18
4.2 Collision 19
4.3 Noise 20
4.4 Electrocution 21
4.5 Habitat Loss 22
4.6 Potential Impacts to Special Status Avian Species 23
4.6.1 Mountain Plover 23
4.6.2 Golden Eagle 23
4.6.3 California Condor 24
4.6.4 Burrowing Owl 25
4.6.5 Tricolored Blackbird 27
4.6.6 Grasshopper Sparrow 28
4.6.7 Short-Eared Owl 29
4.6.8 Long-Eared Owl 29
4.6.9 Swainson's Hawk 30
4.6.10 Northern Harrier 30

DRAFT

4.6.11 White-Tailed Kite 31
4.6.12 Loggerhead Shrike 32
4.6.13 Oregon Vesper Sparrow 32
4.7 Cumulative Impacts 33

5.0 AVOIDANCE, MINIMIZATION, AND MORTALITY REDUCTION MEASURES 33

5.1 General Avoidance and Minimization Measures 33

6.0 CONSTRUCTION AND POST-CONSTRUCTION MONITORING (TIER 4) 41

6.1 Breeding Monitoring and Nesting Management 41
6.2 Mortality Monitoring 43
6.2.1 Standard Mortality Monitoring 44
6.2.1 Operation and Maintenance Monitoring 47

7.0 REPORTING 47

7.1 Construction 47
7.2 Post-Construction 47

8.0 ADAPTIVE MANAGEMENT (TIER 5) 48

8.1 Regulatory Policy Changes 48
8.2 Post-Construction Agency Consultation 48

9.0 LITERATURE CITED 49

TABLES:

Table 1 Potential special status bird species on the Panoche Valley Solar Facility 9
Table 2 Raptor species' nest and/or individuals observed during 2010 Aerial Survey 15
Table 3 Buffer zones associated with the Burrowing Owl at the Project Footprint 26

APPENDICES:

Appendix A Figures
Appendix B Avian Species Observed During 2003-2011 Audubon Christmas Bird Counts

FIGURES:

Figure 1: Project Location
Figure 2: Project Footprint
Figure 3: Project Footprint and Conservation Lands
Figure 4: Point Count Stations - Project Footprint/Valley Floor Conservation Lands
Figure 5: Point Count Stations - Valadeao Ranch Conservation Lands
Figure 6: Point Count Stations - Silver Creek Ranch Conservation Lands

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Acronyms, Abbreviations, and Definitions

ACE	Avian Conservation Strategy
APLIC	Avian Power Line Interaction Committee
BGEPA	Bald and Golden Eagle Protection Plan
BLM	Bureau of Land Management
BMPs	Best Management Practices
CBC	Christmas Bird Count
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
Conservation Lands	Areas to be preserved in perpetuity for the benefit wildlife, totaling 24,176 acres
County	San Benito County
dBA	A-weighted decibels
DC	direct current
EIS	Environmental Impact Statement
FESA	Federal Endangered Species Act
°F	Fahrenheit
FEIR	Final Environmental Impact Report
GPS	Global Positioning System
HCP	Habitat Conservation Plan
HMMP	Habitat Management and Monitoring Plan
km	kilometer
MBTA	Migratory Bird Treaty Act
MW	megawatts
NEPA	National Environmental Policy Act
O&M	Operations and Maintenance
Project Footprint	The portion of the Proposed Project that includes the solar arrays and associated transportation corridors and equipment, totaling 2,506 acres (with 1,888 acres of permanent disturbance).
Proposed Project	Panoche Valley Solar Project
PV	photovoltaic
PVS	Panoche Valley Solar, LLC
SCRCL	Silver Creek Ranch Conservation Lands
UDA	Utilization Distribution Assessment
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator
VFCL	Valley Floor Conservation Lands
VRCL	Valadeao Ranch Conservation Lands
WEGs	USFWS Land-based Wind Energy Guidelines

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1.0 INTRODUCTION

Panoche Valley Solar LLC (PVS) proposes to construct and operate an approximately 247 megawatt (MW) solar photovoltaic energy generating facility in San Benito County, California by the name of the Panoche Valley Solar Facility. The Panoche Valley Solar Facility is referred to herein as the "Project". The Project would be located on 2,506 acres with 1,888 acres of permanent disturbance in the Panoche Valley of eastern San Benito County. The Project includes construction and operation of the photovoltaic (PV) solar array complexes, an operations and maintenance (O&M) building, a project perimeter road including emergency access and egress, electricity collection lines, DC-AC inverters, an electrical substation and switchyard, associated Pacific Gas and Electric (PG&E) telecommunications upgrades, and decommissioning of the Project. Construction of the PVS Facility is anticipated to commence the first or second quarter of 2015 and span approximately 18 months, to be completed by the end of 2016.

The Project incorporates important general and species specific conservation measures proposed by PVS to avoid and minimize impacts on biological resources including avian resources. In addition, the Project will implement a conservation package consisting of permanent preservation, enhancement, and management of three large parcels of land in the vicinity of the Project to offset potential impacts to special status species. These conservation lands include approximately 2,514 acres of Valley Floor Conservation Lands, 10,772 acres of Valadeao Ranch Conservation Lands, and 10,890 acres of Silver Creek Ranch Conservation Lands. Together the three parcels total approximately 24,176 acres of high quality conservation land that will provide local mitigation, preserve core populations of special status species, and create permanent movement corridors with adjacent lands controlled by the U.S Department of Interior's Bureau of Land Management (BLM) for those species.

1.1 Purpose of the Avian Conservation Strategy

The following site-specific Avian Conservation Strategy (ACS) outlines various processes that PVS has and/or will employ to: 1) comply with all state and federal avian conservation and protection laws and regulations at the Project; 2) to ensure that any impacts to avian resources are identified, quantified, and analyzed; and 3) implement various conservation, avoidance, minimization, mitigation and adaptive management measures to address any impacts that result from the operation of the Project.

Impacts to bats are discussed in the project FEIR. Although project development has the potential to impact special-status bat species through loss of foraging; habitat within the project footprint is considered sub-optimal.

1.2 Regulatory Framework

Native birds in North America are protected under federal and state regulations: these include the Federal Endangered Species Act (FESA), the Migratory Bird Treaty Act (MBTA), the Bald and Golden Eagle Protection Act (BGEPA), the California Endangered Species Act (CESA), and California Department of Fish and Game (CDFG) codes administered by the California Department of Fish and Wildlife (CDFW). These regulations are described in the following sub-sections.

1.2.1 Federal Endangered Species Act

The purpose of the FESA is "to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, and to provide a program for the conservation of these species." Section 9 of the FESA prohibits "take" of federally-listed threatened or endangered species. "Take" under the FESA includes activities such as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" which includes harming a listed species or its habitat. Any activity that may result in the "incidental take" of a threatened or endangered species requires authorization pursuant to the FESA by means of the Section 7 consultation process with the United States Fish and Wildlife Service (USFWS), or through a Section 10 permit issued from the USFWS in conjunction with development of an approved Habitat Conservation Plan (HCP).

In addition, an amendment to the Fish and Wildlife Conservation Act (1988) mandates that the USFWS must identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the FESA.

1.2.2 Bald and Golden Eagle Protection Act

The BGEPA of 1940 is the primary law protecting eagles in the United States. The BGEPA (United States Code [USC] Title 16, Chapter 5A, Subchapter II, § 668 a-d), as amended provides for the protection of Bald Eagles (*Haliaeetus leucocephalus*) and Golden Eagles (*Aquila chrysaetos*) by prohibiting the taking, possession, and commerce of such birds and establishes civil penalties for violation of this Act. BGEPA defines "take" to include "pursue, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb," and prohibits take of individuals and their parts, nests, or eggs. On November 10, 2009 the USFWS implemented new rules (74 FR 46835) governing the "take" of Golden and Bald Eagles under the existing BGEPA. The USFWS expanded the definition of "take" to include the term "destroy" to ensure that "take" includes destruction of eagle nests. The term "disturb" is further defined by regulation as "to agitate or bother a Bald or Golden Eagle to a degree that causes, or is likely to cause, injury to an eagle, a decrease in productivity, or nest abandonment" (50 Federal Regulation [FR] 22.3). USFWS guidance on the applicability of current Eagle Act statutes and mitigation is currently under review. The definition of disturb (72 FR 31132) includes interfering with normal breeding, feeding, or sheltering behavior to the degree that it causes or is likely to cause decreased productivity or nest abandonment. All activities that may disturb or incidentally take an eagle or its nest as a result of an otherwise legal activity must be permitted by the USFWS under this act.

A permit for take of Golden Eagles, including take from disturbance such as loss of foraging habitat, may be required for the Proposed Project. Because large-scale solar projects could result in the loss of Golden Eagle foraging habitat, there are concerns about the cumulative impacts to Golden Eagles. If a permit is required, it is expected permits would only be issued for safety emergencies or if conservation measures implemented in accordance with a permit would result in a reduction of ongoing take or a net take of zero.

1.2.3 Migratory Bird Treaty Act

The MBTA (Title 16 USC 703-712, as amended) governs take, possession, import, export, transport, selling, purchasing, or bartering of migratory birds, their eggs, parts and nests except as authorized by a valid permit (50 Code of Federal Regulations [CFR] 21.11 or under Section 704, as prescribed by the Secretary of the Interior. The USFWS is responsible for overseeing compliance with the MBTA. The MBTA requires that disturbance of active nesting territories be reduced or eliminated during critical phases of the nesting cycle for birds that may be present and nesting in the vicinity of a project. This Act offers protection to 836 species of migratory birds which includes waterfowl, shorebirds, seabirds, wading birds, raptors, passerines, and their occupied nests and eggs. Most bird species and their occupied nests that occur within the Project Footprint are protected under the MBTA. Most actions that result in taking of or the permanent or temporary possession of a protected avian species constitute violations of the MBTA. The Migratory Bird Permit Memorandum dated April 15, 2003, clarifies that destruction of most unoccupied bird nests is permissible under the MBTA; exceptions include nests of federally listed threatened or endangered migratory birds, Bald Eagles, and Golden Eagles.

1.2.4 California Endangered Species Act and Other State Fish and Game Codes

The California Endangered Species Act (CESA) of 1970 is administered by the CDFW and states that all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation, will be protected or preserved. The CESA prohibits the take (hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill) of species listed under CESA.

In addition, California Fish and Game Code Subsections 3503, 3503.5, and 3800 prohibit the possession, incidental take, or needless destruction of eagles and other birds, as well as their nests and eggs. California Fish and Game Code Section 3511 lists birds that are “fully protected” as those that may not be taken or possessed except under specific permit. Lastly California Fish and Game Code Section 3513 prohibits any take or possession of birds that are designated by the MBTA as migratory non-game birds except as allowed by federal rules and regulations promulgated pursuant to the MBTA.

1.3 Corporate Policy

Panoche Valley Solar, LLC (PVS) maintains a commitment to work with local, state, and federal agencies regarding the protection of special status and migratory birds. PVS recognizes the importance of coordination with agency personnel to understand the scope of the Project and discuss facilities and features that may require specific attention for special status and migratory bird species. PVS and their representatives (e.g. environmental consultants) have been working in coordination with state and federal agency personnel regarding surveys and Project considerations to ensure that everyone understands the scope of the Project and potential issues that were identified early in the Project’s planning process.

This Avian Conservation Strategy (ACS) has been prepared in general accordance with the USFWS Land-based Wind Energy Guidelines (WEGs) (USFWS 2013) which tier-based approach for assessing risk to wildlife in the course of siting, constructing, and operating wind energy facilities. While the WEGs were not specifically developed to address risk for solar projects, the process developed provided a useful framework for assessing wildlife risk at the site and developing this ACS. This strategy is considered to be a living document that will be updated periodically as new information becomes available.

2.0 PROJECT INFORMATION

2.1 Project Location

The Project is located near the intersection of Panoche Road and Little Panoche Road, in eastern San Benito County and western Fresno County, approximately two miles north of the intersection of Panoche Road and Little Panoche Road. This location is approximately two miles southwest of the Fresno County Line and the Panoche Hills, and approximately 15 miles west of Interstate 5 and the San Joaquin Valley. The Project Footprint would be located within Township 15S, Range 10E, Sections 3-4, 8-11, and 13-16 of the United States Geologic Survey's Cerro Colorado, Llanada, Mercy Hot Springs, and Panoche 7.5-minute topographic quadrangle maps.

In addition to the Project Footprint, the Conservation Lands associated with the Proposed Project are located within Township 15S, Range 10E, Sections 3-4, 8-10, 13-16, and 25; Township 15S, Range 11E, Section 19; Township 14S, Range 10E, Sections 21-27, and 32-36; Township 14S, Range 11E, Sections 19, and 29-32; Township 15S, Range 10E, Sections 1-8, and 10-14; Section 15S, Township 11E, Sections 6-7, 19-20, and 26-36; and Township 16S, Range 11E, Sections 1-6, and 8-12.

The Project is bordered by rangeland to the north and south, by the Gabilan Range to the west, and by the Panoche Hills to the east. The Project Footprint elevation ranges from approximately 1,200 feet above mean sea level (amsl) near the southeastern end of the Project site to approximately 1,400 feet amsl near the western end of the Project site. Panoche Creek and Las Aquilas Creek pass through the Project Footprint. The Project site was historically used for crop production, but during the past forty years the primary land use has been livestock grazing.

2.2 Project Description

PVS proposes to construct and operate a solar photovoltaic (PV) energy generating facility located in San Benito County, California (Figure 1, Appendix A). The Project is called the Panoche Valley Solar Facility (PVS Facility or the Project) (Figure 2, Appendix A).The Project Footprint consists of approximately 2,506 acres in the Panoche Valley of eastern San Benito County, California. The Project includes construction and operation of the PV solar array complexes, an O&M building, a project perimeter road including emergency access and egress, electricity collection lines, DC-AC inverters, an electrical substation and switchyard, associated PG&E telecommunications upgrades, and decommissioning of the Project. Construction of the PVS Facility is anticipated to proceed in phases for a span of approximately 18 months, with construction estimated to be completed by 2016. The Project also includes the permanent preservation and management of approximately

24,176 acres of high quality Conservation Lands that are contiguous with the Project Footprint when taken as a whole (Figure 3, Appendix A).

As part of those high quality Conservation Lands, approximately 2,514 acres of the high quality land is interspersed throughout and adjacent to the Project Footprint which would be left undisturbed and designated as the Valley Floor Conservation Lands (VFCL). The VFCL would include wildlife movement corridors within on-site drainages and 100-year floodplains, as well as open space in the southern portion of the Project area. These undisturbed areas would remain as open space and would be managed as conservation areas to maintain and enhance habitat conditions for listed species (Figure 3, Appendix A).

In addition to the designation of the VFCL, the Project will include two large ranches for conservation/mitigation purposes due to impacts to waters, sensitive species and habitat. These ranches, the Valadeao Ranch Conservation Lands (VRCL; 10,772 acres) and the Silver Creek Ranch Conservation Lands (SCRCL; 10,890 acres), are contiguous with the Project Footprint and each other (Figure 3, Appendix A). The combined total acreage to be placed in permanent preservation and management is approximately 24,176 acres.

3.0 EXISTING CONDITIONS

3.1 Project Footprint

The Project Footprint consists of the area within the fence line of the solar facility and is composed of approximately 2,506 acres of introduced annual grasslands. Historically, the Project Footprint was used for crop production; however, in the past approximately 40 years the site has been used for cattle grazing. The site is surrounded by rangeland and bordered by hills of the Gabilan Range to the west and the Panoche Hills to the east. The topography of the site dips gently down to the east-southeast. The site elevation ranges from approximately 1,200 feet amsl near the southeast end of the site to approximately 1,400 feet amsl near the west end.

The Project area experiences a Mediterranean climate with dry hot summers and cool wet winters. However, this region does not experience heavy rainfall. Annual precipitation in the general vicinity of the site ranges from eight to ten inches per year. Approximately 85 percent of precipitation falls between October and March. Temperatures average approximately 80 degrees Fahrenheit (˚F) in the summer and 40˚F in the winter, mid-summer temperatures are often over 100˚F, and winter lows can be close to freezing. Nearly all precipitation infiltrates into the site's soils and flows in creeks and drainages when soil capacity has been reached.

Panoche Creek and Las Aquilas Creek run between portions of the Project Footprint but are contained entirely within the VFCL (Figure 3, Appendix A). They are ephemeral creeks that are dry in the summer. Smaller washes and drainages feed these larger creeks. The Project site supports several seasonally flooded pools and stock ponds, predominantly in the northern portion of the Project Footprint along unnamed washes. Habitat for aquatic species and breeding habitat for amphibians within the Project Footprint is limited to the stock ponds and ephemeral pools.

There is no urban development on the Project site or surrounding area. Two ranching communities are located within the Panoche Valley, Panoche and Llanada. Both communities are within two miles of the Project Footprint. The nearest rural community is Firebaugh, approximately 15 miles from the perimeter of the Project Footprint.

Prominent grass species within the Project Footprint include ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), red brome (*Bromus madritensis*), foxtail barley (*Hordeum murinum* ssp. *leporinum*), and rat-tail fescue (*Vulpia myuros*). Dominant forbs included broad-leaved filaree (*Erodium botrys*), red-stemmed filaree (*Erodium cicutarium*), shining peppergrass (*Lepidium nitidum* var. *nitidum*), and vinegarweed (*Trichostema lanceolatum*). Fiddleneck (*Amsinckia menziesii*), devils lettuce (*Amsinckia tessellata*), shepherds purse (*Capsella bursa-pastoris*), turkey mullein (*Eremocarpus setigerus*), and bur clover (*Medicago polymorpha*) were also common, especially along ranch roads. Areas which have not been previously disturbed by grazing or historic cultivation also include a variety of native wildflowers such as blow wives (*Achyrachaena mollis*), blue dicks (*Dichelostemma capitatum*), California gold fields (*Lasthenia californica*), yellow daisy tidy-tips (*Layia platyglossa*), and California creamcups (*Platystemon californicus*) (LOA 2009).

3.2 Conservation Lands

Project Conservation Lands include three areas totaling 24,176 acres that would be preserved in perpetuity for the benefit of the special status species, as well as many other species of wildlife including avian species. An additional 2,514 acres interspersed throughout and adjacent to the Project Footprint would be left undisturbed and designated as the VFCL. In addition to the designation of the VFCL, the Project will include two large ranches for conservation purposes. These ranches, the VRCL (10,772 acres) and the SCRCL (10,890 acres), are contiguous with the Project site and each other (Figure 3, Appendix A).

3.2.1 Valley Floor Conservation Lands

The VFCL (approximately 2,514 acres) are contiguous with the Project Footprint, and primarily consist of the non-native annual grassland habitat found within the Project Footprint with some seasonal ponds and vernal and ephemeral pools, as well as the seasonally dry Panoche and Los Aquilas Creeks. The VFCL also includes the entire 100-year floodplain within the Proposed Project boundary on the valley floor.

The dominant vegetation in the VFCL includes ripgut brome, soft chess, red brome, foxtail barley, rat-tail fescue, broad-leaved filaree, red-stemmed filaree, shining peppergrass, and vinegarweed. Fiddleneck, devils lettuce, shepherds purse, turkey mullein, and bur clover were also common, especially in disturbed areas. Areas which have not been previously disturbed include a variety of native wildflowers such as blow wives, blue dicks, California gold fields, yellow daisy tidy-tips, and California creamcups.

3.2.2 Valadeao Ranch Conservation Lands

The VRCL (approximately 10,772 acres) are contiguous with the Project Footprint directly to the west, east, and northeast of the site (Figure 3, Appendix A). These lands are also contiguous with

the VFCL and Silver Creek Ranch Conservation Lands (SCRCL). The VRCL include several seasonal drainages. Soils on this site are complex and range from sandy to sandy loam to clay loam to badlands. The VRCL contain approximately 2,945 acres with slopes between 0 and 11 percent. Elevations on the VRCL range from approximately 1,400 feet to 2,100 feet amsl. The property which is currently grazed is dominated by introduced annual grasslands (approximately 6,700 acres), which have a very similar species makeup to the Project Footprint and VFCL. This property also includes of ephedra shrubland (approximately 2,700 acres), barrens, and saltbush shrubland.

Ephedra shrublands within the VRCL range from nearly pure California ephedra (*Ephedra californica*) stands to highly diverse associations with typical desert shrubs. Occupied habitats occur from lower slopes and valley bottoms to rocky outcrops and alluvial slopes. This three to 15 foot tall shrub rarely achieves greater than 10 percent cover, but the cover provided varies little with soil type, aspect, or grazing pressure. It is generally the only shrub present in the often very broad transition from Ephedra shrublands to introduced annual grasslands.

Plant associations that are noted to occur within the *Ephedra* shrublands include *Artemisia californica - Senecio flaccidus* scrub, *Eastwoodia elegans - Ephedra californica* scrub, *Ericameria linearifolia - Ephedra californica* scrub, *Ericameria linearifolia - Ericameria nauseosa* scrub, *Ericameria linearifolia - Gutierrezia californica* scrub, *Eriogonum fasciculatum* var. *polifolium - Artemisia californica* scrub, *Eriogonum fasciculatum* var. *polifolium - Ephedra californica* scrub, *Eriogonum fasciculatum* var. *polifolium - Gutierrezia californica* scrub, *Eriogonum fasciculatum* var. *polifolium - Yucca whipplei* scrub, and *Gutierrezia californica - Ephedra californica* scrub. Ephedra shrublands occur in the VRCL portion of Las Aquilas Creek in small patches along ridgelines, steep slopes with a northern aspect, lower slopes, ephemeral drainages, and steep, rocky, and thin-soiled south-facing slopes.

Barrens are ridgelines and south or (rarely) west-facing very steep slopes that exhibit a precipitous drop-off in vegetative cover. In terms of vegetation, the assembled species diversity at barrens is very low, nearly all species are relatively short-lived annuals, shrubs and trees are absent, and introduced annual grasses become minor components of the species mix. Barrens most commonly interrupt Introduced Annual Grasslands, where the transition was often observed to occur over the space of several feet. Two plant associations were identified within the barrens: *Erodium cicutarium - Plantago erecta* and *Holocarpha obconica - Vulpia microstachys*.

The saltbush shrubland habitat consists of nearly pure to mixed stands of saltbush (*Atriplex polycarpa*) associations. Occupied habitats range from white clay soils on hills immediately west of Little Panoche Road to rocky outcrops and alluvial slopes experiencing high ground creep rates near ridgelines east of the road. In all observed occurrences on hills, the aspect of greatest saltbush cover is southern. This two to three foot tall shrub also attains dominance within several of the ephemerally flooded washes, where sandier soils are more common. It is always the most common shrub canopy contributor near seasonal springs and seeps that exhibit saline character.

Two plant associations exist on the VRCL: *Atriplex polycarpa - Eriogonum fasciculatum* var. *polifolium* and *Atriplex polycarpa - Isocoma acradenia* var. *bracteosa*. *Atriplex polycarpa - Eriogonum fasciculatum* var. *polifolium* occurs on slopes, appearing as mainly open ground with scattered shrubs. Shrub canopy closure averages 5 to 10 percent, with scattered clumps of 20

percent closure. Canopy density is greatest on south-facing slopes, where *Eriogonum fasciculatum* is often more prevalent, and on slopes that are steep or slippery enough to exclude grazing. The herbaceous layer is largely absent, resembling barrens that are often present on adjacent slopes of similar aspect. Shrub canopies are confined to wash edges due to trampling by cattle, and average cover rarely exceeds 10 percent (County of San Benito, 2010).

3.2.3 Silver Creek Ranch Conservation Lands

The SCRCL (approximately 10,890 acres), which is currently being grazed with livestock, is located southeast of the Project Footprint (Figure 3 Appendix A). The northwestern most corner of the proposed SCRCL is contiguous with a portion of the VRCL. Elevations on the SCRCL range from 900 to 2,200 feet amsl. Soils on the SCRCL are less complex than those found on the VRCL and are generally characterized as well drained and moderately permeable. SCRCL contains approximately 5,765 acres with slopes between 0 and 11 percent.

SCRCL are dominated by non-native species (approximately 8,400 acres), with the same species found on the Project Footprint and on the other conservation lands distributed sparsely over the landscape. The other major habitats on these conservation lands include ephedra shrubland (approximately 2,260 acres) with similar species noted on the VRCL and riparian/wetland habitat.

The riparian habitats occur along the Panoche and Silver Creeks. The Silver Creek riparian vegetation, where it briefly intersects the SCRCL, indicates a seasonally wet, somewhat saline habitat subject to annual or occasional energetic flows. The riparian corridor has become dominated by invasive tamarisk (*Tamarix* sp.). Tamarisk has developed semi-open to impassable stands in a 30 to 100 foot wide corridor. The population extends well off-site, both upstream and downstream. In this area, saltgrass (*Distichlis spicata*) appears to be the native species most tolerant of the soil salinity and groundwater drawdown effects of heavy tamarisk infestation, and often forms meadow-like swards between the tamarisk thickets.

Panoche Creek is a gaining reach as it crosses through the SCRCL. The streambed upstream off the site was observed to be completely dry and largely devoid of plants for at least three miles. Within the surveyed area, this arroyo-like habitat quickly transitions to zonal wetlands characterized by gaseous springs, highly reduced soils, and marsh or meadow vegetation. The Panoche Creek riparian zone, which ranges from 100 feet to 500 feet in width, may provide the only reliable, naturally occurring surface water for much of the year. The dominant plants are consistently arrayed, with vegetation classified as emergent *Typha* marsh (*Typha* Herbaceous Alliance) centrally, *Schoenoplectus americanus* mid-marsh (*Schoenoplectus americanus* Herbaceous Alliance) at the outer saturated edge, and *Distichlis spicata* meadow (*Distichlis spicata* Herbaceous Alliance) extending across the moistened to seasonally drying soils at the riparian edge and *Frankenia salina* and *Juncus mexicanus*. Trees are largely absent, as are species adapted to a floating or submerged habitats (County of San Benito, 2010).

3.3 Literature Review and Initial Site Assessment (Tiers 1 and 2)

Existing information of avian resources in the vicinity of the Project Footprint was reviewed prior to the development of this strategy. Information sources included the California Natural Diversity

Database (CNDDB), the National Audubon Society's Important Bird Area database (National Audubon Society 2013) and Christmas Bird Count (CBC) database, and habitat assessments and field-based evaluations determining the potential for special status species as well as observation that were made during site visits between 2009 through 2013.

3.3.1 Special Status Avian Species

The review of existing information and literature pertaining to avian special status species occurrences on the Project Footprint, combined with field-based habitat evaluations of the potential for special status avian species occurrence, revealed 15 avian species that have been observed on or near the Project Footprint or had potential to occur on the Project Footprint. Table 1 presents a list of the special status species and their potential for occurrence on the Project Footprint. Species were considered special status if they are currently afforded federal or state protection or have Species of Special Concern status with the USFWS or CDFW.

Table 1. Potential special status bird species of the Panoche Valley Solar Facility.

Common/Scientific Name	State Status	Federal Status	Potential to Occur on Project Footprint
Tricolored Blackbird *Agelaius tricolor*	SSC (breeding)	NA	Present (non-breeding observation)
Grasshopper Sparrow *Ammodramus savannarum*	SSC (breeding)	NA	Moderate
Golden Eagle *Aquila chrysaetos*	FP	BGEPA	Present (non-breeding observation)
Short-Eared Owl *Asio flammeus*	SSC (breeding)	NA	Moderate
Long-Eared Owl *Asio otus*	SSC (breeding)	NA	Moderate
Burrowing Owl *Athene cunicularia*	SSC (breeding)	NA	Present
Swainson's Hawk *Buteo swainsonii*	ST	NA	Low
Mountain Plover *Charadrius montanus*	SSC (wintering)	NA	Present
Northern Harrier *Circus cyaneus*	SSC (breeding)	NA	Present (non-breeding observation)
White-Tailed Kite *Elanus leucurus*	FP	NA	Low
California Condor *Gymnogyps californianus*	SE and FP	FE	Low
Bald Eagle *Haliaeetus leucocephalus*	SE and FP	BGEPA	Not Likely To Occur
Loggerhead Shrike *Lanius ludovicianus*	SSC (breeding)	NA	Present (non-breeding observation)
Oregon Vesper Sparrow *Pooecetes gramineus affinis*	SSC (wintering)	NA	High
Yellow-Headed Blackbird *Xanthocephalus xanthocephalus*	SSC (breeding)	NA	Not Likely To Occur

State Status: SE – State Endangered, ST – State Threatened, FP – State Fully Protected, SSC – Species of Special Concern
Federal Status: FE – Federal Endangered, BGEPA – Bald and Golden Eagle Protection Act, NA – Not Applicable

3.3.2 Important Bird Area

The Panoche Valley is considered an Important Bird Area (Panoche Valley IBA) (National Audubon Society 2013) due to the notable high concentrations of wintering raptors, large sparrow flocks, resident population of Burrowing Owls (*Athene cunicularia*), and other grassland avian species. The Project Footprint consists of 2,506 acres located within the 91,399-acre Panoche Valley IBA covering portions of Merced, Fresno, and San Benito Counties (National Audubon Society 2013). Grasshopper Sparrows (*Ammodramus savannarum*) and Short-eared Owls (*Asio flammeus*) use the Panoche Valley as breeding habitat, as both have been almost eliminated as nesters elsewhere in the San Joaquin Valley. During the winter, Mountain Plovers (*Charadrius montanus*) use the grassland habitat within the Panoche Valley IBA as foraging areas. The Panoche Valley IBA is one of the few areas within the state where this species still winters in semi-natural habitat. Hundreds of Tricolored Blackbirds (*Agelaius tricolor*) breed each year at Little Panoche Reservoir near Interstate 5, which is approximately nine miles north of the northernmost extent of the Project Footprint (National Audubon Society 2013). The Panoche Valley was noted to be an Audubon Important Bird Area of global concern because it is important for the wintering Mountain Plover (CDFG 2010).

3.3.3 Christmas Bird Count Data

The Christmas Bird Count (CBC) is a 24-hour census of birds administered by the National Audubon Society that is performed annually in the early winter by volunteers to gather avian population data. The surveys of the CBC count circles, which are 15 miles in diameter, are conducted in the period from December 14 to January 5 each year (National Audubon Society, 2014). The center of the Panoche Valley CBC survey circle is located two miles north of the junction of Panoche Valley Road and Littler Panoche Valley Road. The Panoche Valley CBC count circle includes all of the Project Footprint and the VFCL and a majority of the VRCL and the SCRCL.

From 2003 through 2011 the CBC data indicated an average of 80 avian species per survey season. The entire period between 2003 and 2011 is noted to have approximately 127 total species observed. The entire list of species observed is shown in Appendix B.

3.4 Previous Avian Surveys, Methods, and Results (Tiers 2 and 3)

Focused avian surveys and general wildlife surveys have been conducted on the Project Footprint and conservation lands from 2009 to 2013. Data collected during wildlife reconnaissance and transect surveys, Golden Eagle/raptor aerial nest surveys; Golden Eagle point counts and Utilization Distribution Assessments (UDA) provide information on baseline avian conditions at the Project Site and surrounding area. Additionally, incidental observations of special status avian species were recorded during these surveys and other previous biological surveys conducted on the Project Footprint and conservation lands.

3.4.1 Golden Eagle

Point Count Surveys

Point count surveys focusing on Golden Eagles were conducted at established point count stations (Cooperrider et al. 1986; Hamel et al. 1996; Ralph et al. 1993; Ralph et al. 1995) every other week between the weeks of September 3, 2013 until January 24, 2014 for a total of 11 survey events. Six point count stations were located within Project Footprint/VFCL (Figure 4, Appendix A) to ensure a minimum spatial coverage of at least 30 percent of the Project Footprint (USFWS 2013). Six point count stations were also located within the VRCL and the SCRCL. Three point count stations were located in the VRCL (Figure 5 Appendix A) and three point count stations in the SCRCL (Figure 6 Appendix A). The coverage for the VRCL and SCRCL was less than 30 percent, but provided adequate observations of Golden Eagle use in these areas for general comparison purposes.

The survey locations were established by creating point count stations within an 800 meter (2,625 feet) radius observation area. The center point of each plot was geo-referenced using a global positioning system (GPS) unit. The point count surveys consisted of observers recording detections of Golden Eagles from the point count stations for two hours at each point count station (Figures 4, and 5 Appendix A). Observations were recorded on point count field forms (Pagel et al. 2010; USFWS 2013). The Golden Eagle surveys were conducted between daylight hours (sunrise to sunset) on a bi-weekly basis from September 3, 2013 to January 24, 2014. During the fall migration, when possible, surveys were completed during midday to increase sampling efficiency by temporally stratifying surveys to cover the midday period during migration (CA Energy Commission 2007; USFWS 2013).

The data collected during each point count station survey beyond the typical conditions information (e.g. date, time, temperature, wind speed and direction, and visibility) included the number of Golden Eagles seen, age class, activity/behavior, flight paths, estimated flight height and location in plot, and general description of observations.

With the data from the point count surveys, the age classes of the Golden Eagles were broken down into juvenile eagles, immature or sub-adult eagles, adult eagles, or unknown (eagles where age class could not be determined due to distance, etc.). The activity/behavior data collected noted the prevalent behavior during each one-minute interval as soaring flight (circling broadly with wings outstretched), unidirectional flapping gliding, kiting-hovering, stooping or diving at prey, stooping or diving in an agonistic context with other eagles or other bird species, undulating/territorial flight, perched, or other. The flight path data included Golden Eagles inside, as well as outside the plot. The flights were recorded on the point count data forms for each point count station (Appendix C).

Project Footprint/Valley Floor Conservation Lands

The Golden Eagle observations in the Project Footprint/VFCL totaled 43 Golden Eagles, with 15 observations within the point count plot boundaries and 28 observations outside the plot boundaries for the entire survey season. These observations were also categorized by their age class. The Golden Eagles observation on the Project Footprint/VFCL were made up of four juveniles, three inside the point count plot boundaries and one observation outside the plot boundaries.

There were two sub-adult Golden Eagles observed within the point count plot boundaries and none outside. The surveys also found 14 adult Golden Eagles observations within the Project Footprint/VFCL areas, with seven adults being seen inside the plot boundaries, and seven adult Golden Eagles observed outside the plot boundaries. Furthermore, there were 33 Golden Eagles observations where the age class could not be determined and were categorized as unknown (Table 1). A majority of the unknown age class observations were due to the distance between the observer and the Golden Eagles. Additional information can be located in the Panoche Valley Solar Point Count Survey Study Report for Golden Eagles located in Appendix C of this Plan.

The point count station with the highest number of observations of Golden Eagles, both inside and outside the plot boundaries, was the station located in the northwestern portion of the Project Footprint/VFCL (P-01) (Figure 4 Appendix A) with a total of 23 Golden Eagle observations (10 inside/13 outside). Note that the high number of Golden Eagles observations at this point count station was due to numerous Golden Eagles observed utilizing the hills of the VRCL and the hills to the west of the VRCL for perching, foraging, etc. An additional event elevated the number of Golden Eagles observed at this point. During the second survey event (September 17-19, 2013), seven Golden Eagles were observed feeding on a carcass of a dead animal (i.e. cattle) during the entire point count survey period (Table 2). The point count station with the lowest number of Golden Eagle observations during the survey season was the point count station located in the southeastern portion of the Project Footprint/VFCL (P-06) (Figure 4 Appendix A) with no Golden Eagles observed during any of the point count surveys. Additional information can be located in the Panoche Valley Solar Point Count Survey Study Report for Golden Eagles located in Appendix C of this Plan.

Of the 15 Golden Eagles observations within the Project Footprint/VFCL observed within the point count plots, over half of the observations (eight Golden Eagles) were seen within the month of September (Table 3). As previously stated, during the second survey event (September 17-19, 2013), seven Golden Eagles were observed feeding on a carcass of a dead animal during the entire point count survey period. The next highest number of observations during a month was the events in October with four Golden Eagles. The observation numbers for the other months included two observations in January, one Golden Eagle observation in December, and no observations of Golden Eagles in November within the Project Footprint/VFCL during the point count surveys. Additional information can be located in the Panoche Valley Solar Point Count Survey Study Report for Golden Eagles located in Appendix C of this Plan.

Valadeao Ranch Conservation Lands

The Golden Eagle observations in the VRCL totaled 11 Golden Eagles with four observations within the point count plot boundaries and seven observations outside the plot boundaries for the entire survey season (Appendix C). These observations were also categorized by their age class. The Golden Eagle observations on the VRCL were made up of two juveniles, all inside the point count plot boundaries. There were no sub-adult Golden Eagles observed within the point count plot boundaries or outside the plot boundaries. The surveys also found two adult Golden Eagle observations within the VRCL areas, all being seen inside the plot boundaries. Furthermore, there were seven unknown age class observations that were observed outside the plot boundaries. The unknown age class observations were due to the distance between the observer and the Golden Eagles.

The point count station with the highest number of observations of Golden Eagles, both inside and outside the plot boundaries was located in the central portion of the VRCL (V-02) (Figure 5 Appendix A) with a total of seven Golden Eagles observations (two inside/five outside). The point count stations within the VRCL with the lowest number of Golden Eagles observations during the survey season was the point count station located in the southern and northern portions of the VRCL (V-01 and V-03) (Figure 5 Appendix A) with two Golden Eagle observations each during the entire study (Appendix C).

Of the four Golden Eagle observations within the VRCL observed within the point count plots, 75 percent of the observations (three Golden Eagles) were seen within the month of September (Table 4). The next highest number of observations during a month was the events in January with one Golden Eagle observation. For the months of October, November, and December, no observations of Golden Eagles were made within the VRCL during the point count surveys. Additional information can be located in the Panoche Valley Solar Point Count Survey Study Report for Golden Eagles located in Appendix C of this Plan.

Silver Creek Ranch Conservation Lands

The Golden Eagle observations in the SCRCL totaled seven Golden Eagles with four observations within the point count plot boundaries and three observations outside the plot boundaries for the entire survey season (Figure 6 Appendix A). These observations were also categorized by their age class. The Golden Eagle observations on the SCRCL had no juvenile or sub-adult eagles inside or outside the point count plot boundaries. The surveys found four adult Golden Eagle observations within the SCRCL areas with three observations inside the plot boundaries and one observation outside the plot boundaries. Furthermore, there were three unknown age class observations with one observation inside the plot boundaries and two observations outside the plot boundaries. The unknown age class observations were due to the distance between the observer and the Golden Eagles (Appendix C).

The point count station in the SCRCL with the highest number of observations of Golden Eagles, both inside and outside the plot boundaries was S-03 (Figure 6 Appendix A) SCRCL with a total of four Golden Eagle observations (2 inside/2 outside) (Appendix C). The point count station with the lowest number of Golden Eagle observations during the survey season was located in the western portion of the SCRCL (S-01) (Figure 6 Appendix A) with no Golden Eagles observed during all of the point count surveys.

Of the four Golden Eagle observations within the SCRCL observed within the point count plots, 75 percent of the observations (three Golden Eagles) were seen within the month of January. The next highest number of observations during a month was the events in October with one Golden Eagle observation. For the months of September, November, and December, no observations of Golden Eagles were made within the SCRCL during the point count surveys.

Overall, the results of the point count surveys included a total of 61 observations of Golden Eagles. This total includes 23 individual observations of Golden Eagles seen within the point count plot boundaries and 38 observations outside the plot boundaries.

The results of the point count surveys indicated that 93 percent of the Golden Eagle observations made within the Project Footprint and VFCL point count station boundaries were from the western point count stations, which are in close proximity to the hills located within the western portion of the VRCL. Of the 15 total Golden Eagle observations made during the entire study within point count plots, approximately 47 percent of those observations were seen during a single survey event (September 17-19, 2013), where seven Golden Eagles were observed feeding on a carcass of a dead animal within the proposed Project Footprint. The data gathered during this fall migration/winter survey period indicates that unless there is an attractant (i.e. food) found within the Project Footprint and the VFCL, that Golden Eagles' usage of the Project Footprint is nominal. Additional information can be located in the Panoche Valley Solar Point Count Survey Study Report for Golden Eagles located in Appendix C of this Plan.

Utilization Distribution Assessment (UDA)

The Utilization Distribution Assessment (UDA) for Golden Eagles occurred every other week between the weeks of September 3, 2013 until January 24, 2014 for a total of 11 survey events. The UDA was completed to document the eagle spatial distribution of use on the proposed Project Footprint. The observation data was noted on field maps and then converted into GIS formats for analyses. The field maps were created by placing a grid of square cells, each 0.5 x 0.5 kilometer (km), which was framed by a Universal Transverse Mercator (UTM) system across a map of the Project Footprint to record eagle observations in each 0.25 km^2 cell.

The Project Footprint/VFCL was divided into non-overlapping observation sectors centered on a designated Observation Point, each with a vantage point. The previously mentioned point count stations were utilized for the UDA Observation Points (Figure 4 Appendix A). These locations afforded an unobstructed viewing of the grid cells to more than one km in all directions. The UDA was not conducted on the VRCL and the SCRCL since they are outside of the Project Footprint.

During the UDA, the data recorded by the observers included Golden Eagle activity/behavior and flight path and location. The prevalent activity/behavior of each Golden Eagle was recorded in one-minute intervals as soaring flight (circling broadly with wings outstretched), unidirectional flapping gliding, kiting-hovering, stooping or diving at prey, stooping or diving in an agonistic context with other eagles or other bird species, undulating/territorial flight, perched, or other. The flight paths and location data was recorded on the gridded field maps, using topographic features or distance indicators as location references.

The data was analyzed by simply counting the number of flights intersecting each cell. If the data set had been larger, a specific Golden Eagle distribution of use would have been estimated by using standard kernel analyses (USFWS 2013).

Each survey event was made up of six UDA surveys from designated Observation Points for two hours each. The total hours surveying for Golden Eagles during the UDA study was 132 hours of survey time within the Project Footprint/VFCL (the UDA Study Area). Additional information can be located in the Panoche Valley Solar Point Count Survey Study Report for Golden Eagles located in Appendix C of this Plan.

The results of the UDA surveys included a total of 33 observations of Golden Eagles (Appendix C) which includes observations inside the UDA Study Area and outside the UDA Study Area. Of those 33 observations, 16 Golden Eagles observations were recorded within the UDA Study Area with five identified as adult Golden Eagles, three as sub-adult Golden Eagles, four as juvenile Golden Eagles, and four birds were not able to be identified by age class (Appendix C).

The majority of the Golden Eagle observations came from outside the UDA Study Area near the Observation Points P-01 and P-03 (Figure 4 Appendix A) located in the northwestern and southwestern portions of the UDA Study Area (Appendix C). This is due to numerous sightings of Golden Eagles observed utilizing the hills of the western portion of the VRCL and the hills beyond the western portion of the VRCL for perching, foraging, etc.

During the UDA surveys there were 452 observation minutes of Golden Eagles inside the UDA Study Area and 157 observation minutes of Golden Eagles outside the UDA Study Area for a total of 609 observation minutes for the entire study period. Note that totals for the UDA study included several Golden Eagles that were observed feeding on a carcass of a dead animal (cattle) inside the UDA Study Area in the northwestern portion of the UDA Study Area and remained on the carcass for a majority of the UDA survey event on September 17, 2013. These observations made up 63% (285 observation minutes) of the observation time for Golden Eagles for the UDA Study. In addition, the observation time (120 observation minutes) for a sub-adult eagle that perched on the hillside for the entire UDA survey period in the northwestern portion of the UDA Study Area, noted on January 8, 2014, makes up 90 percent of the observation minutes made during the entire study within the UDA Study Area (Appendix C).

The average observed flight height noted during the study for observations made during UDA surveys, excluding perched Golden Eagles, was approximately 300 feet above ground level. The average flight height for the Golden Eagles observations noted inside the UDA Study Area was similar with an average flight above ground level of approximately 270 feet.

Lastly, due to the small size of the data set (only 16 Golden Eagle flight observations that utilized 57 grid cells within the UDA Study Area) a standard kernel analyses was unable to be utilized. The data was analyzed by calculating the number of flights intersecting an individual grid cell. With exception of the several Golden Eagles observed feeding on a carcass in the northeast corner of the UDA Study area, the cells noted to be utilized by Golden Eagles within the UDA Study Area indicates that the Golden Eagles are not using the northern, southwest, and south central areas of the Project Footprint/VFCL. They also did not frequent the northern portion of the Project Footprint/VFCL. The UDA Study does show, as seen in the point count surveys, that the Golden Eagles are utilizing the hills in the VRCL on both the eastern and western sides of the UDA Study Area for perching, foraging, etc. In addition, the study indicated that flight heights noted inside the UDA Study Area averaged approximately 270 feet with exception of the Golden Eagles noted feeding on the carcass during the noted September survey event. This shows that the eagles mostly are flying across or through the Panoche Valley (i.e. Project Footprint/VFCL) to other habitat to forage or perch. Additional information can be located in the Panoche Valley Solar Point Count Survey Study Report for Golden Eagles located in Appendix C of this Plan.

2010 Golden Eagle Non-Breeding Season Surveys and Raptor Survey

The 2010 surveys, conducted during a non-breeding period, were specifically targeted for Golden Eagle occupancy via individual and nest sightings according to the USFWS Interim Guidelines for Golden Eagle Surveys. Two qualified observation biologists flew over the Project Footprint and areas within a 10-mile radius of the Project. Fifteen Golden Eagle nests were observed within the 10-mile radius of the Project. Four of those nests showed evidence of having fledged young. The survey also noted no Golden Eagle nests occurring within two miles of the Project Footprint boundary and no other raptor or *Corvus* spp. found in the Project Footprint. The number of nests and species observed are indicated in Table 2.

Table 2. Raptor species' nest and/or individuals observed during 2010 Aerial Survey.

Species	Number of Nests/Individuals
Turkey Vulture	1
Red-tailed Hawk	24
Golden Eagle	15
Prairie Falcon	17
Common Barn Owl	1
Great-horned Owl	1

2013 – 2014 Golden Eagle/Raptor Nesting Survey

Helicopter-based Golden Eagle surveys were conducted in August 2010 during a non-breeding period. The surveys were specifically targeted for Golden Eagle occupancy using individual and nest sightings according to the USFWS Interim Guidelines for Golden Eagle Surveys (Pagel et al. 2010). The survey was performed by two qualified biologists who flew surveys over the Project Footprint and conservation lands. Additionally surveys were performed within a 10-mile radius of the Project Footprint. During the flight, one biologist observed at all times while the other recorded and marked data when appropriate. During the surveys, 15 Golden Eagle nests were observed within the 10-mile radius of the Project Footprint. Four of those nests showed evidence of having young fledged this year. No Golden Eagle nests occurred within two miles of the Project Footprint. Additional information can be located in the Panoche Valley Solar Facility - 2014 Final Golden Eagle Nesting Survey Report located in Appendix D of this Plan.

To augment the previously noted 2010 nest survey effort, the USFWS recommended that the PVS conduct "Stage 2" aerial surveys of the Project area nesting population during a January-February time frame before leaf-on. The aerial surveys were conducted for Golden Eagles within ten miles of the Project Footprint in January and April 2014, resulting in the documentation of 46 Golden Eagle nests and an estimated 30 Golden Eagle territories, with nine of them active, though none were located within three miles of the limits of the Project Footprint.

As per guidance provided by the USFWS, an initial round of helicopter surveys was performed over a 10-day period during the early breeding season, from January 15 to 24, 2014. The second round of aerial surveys were conducted over a 7-day period from April 2 to 8, 2014, when active nests were expected to contain eggs or young nestlings.

All surveys were conducted by qualified observers in a helicopter operated by a pilot experienced in conducting aerial Golden Eagle nesting surveys. Survey methodology described in USFWS Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Eagle Management and Permit Issuance (Pagel et al. 2010) was followed to the extent possible. The biologists conducted an aerial examination of all appropriate nesting habitats with ten miles of the Project Footprint. During aerial surveys, the observers searched for large stick nests of Golden Eagles and other raptors on cliff faces, rocky outcrops, trees, transmission towers, and other suitable nesting substrates.

A total of 492 nests were documented by Bloom Biological, Inc. (BBI) within the nesting study survey area, including 46 Golden Eagle nests. Nests classified as belonging to species other than Golden Eagles included nests of 226 Common Ravens (*Corvus corax*), 146 Red-tailed Hawks (*Buteo jamaicensis*), 62 Prairie Falcons (*Falco mexicanus*), eight Barn Owls (*Tyto alba*), three Great Horned Owls (*Bubo virginianus*), and one Turkey Vulture (*Cathartes aura*). See the attached 2014 Final Golden Eagle Nesting Survey Report in Appendix D.

It was estimated that the 46 Golden Eagle nests discovered during this survey effort comprise approximately 30 breeding territories, some of which contain one or more alternate nests. The actual number of territories could be slightly higher or lower than 30, and the exact number of territories depends, in part, on how alternate nests of a single territory are defined. Golden Eagle nesting density (and territory size) is driven primarily by habitat quality, with higher nesting density in better quality habitat. Given that habitat quality in the nesting study survey area varies from quite high (in the northwestern quadrant, where most nests were located), to quite low, in extreme eastern portions, it would not be surprising for nests in some areas to be located as close together as one mile, or even rarely 0.5 miles, particularly in the areas of better quality habitat.

In total, nine Golden Eagle nests were classified as active in the 2014 season, each representing a separate territory. Thus, active nesting occurred in almost one-third (9 of about 30) of the territories identified in this survey. Of these nine nests, eggs are presumed to have been laid in at least four. Adults were observed on nests in incubating posture and two un-incubated eggs were observed in (presumed failed) nests in April. Finally, two chicks were observed being tended to by a female Golden Eagle in early April. Of the remaining five Golden Eagle nests that were identified as active in 2014, none were known to contain eggs or nestlings as of the April 8th survey date. A nest was considered active if any of the following three conditions was met: (1) fresh (live or dead) sticks had been added during the current nesting season, (2) the nest was found to contain eggs or young (dead or alive), or (3) an adult was observed on the nest in an incubating (or brooding) posture. Given that Golden Eagles in this region normally lay eggs on or before this date, it is very unlikely that any of these five nests went on to successfully fledge young during the 2014 nesting season.

No Golden Eagle nests were identified within three miles of the Project Footprint, though four nests were located within four miles of the Project Footprint. Two of these four nests were active in 2014, though neither nest was ever found to contain eggs or nestlings. The next closest active Golden Eagle nest to the Project in 2014 was located approximately 5.79 miles north-northwest of the Project Footprint. For additional information please see the attached 2014 Final Golden Eagle Nesting Survey Report in Appendix D.

3.4.2 Miscellaneous Avian Observations

The wildlife and plant field reconnaissance surveys conducted in April 2009 of the Project Footprint and conservation lands noted miscellaneous observations of Greater Roadrunner (*Geococcyx californianus*), Burrowing Owl, Anna's Hummingbird (*Calypte anna*), Loggerhead Shrike (*Lanius ludovicianus*), Yellow-billed Magpie (*Pica nuttalli*), American Crow (*Corvus brachyrhynchos*), and Common Raven. Additional surveys in February 2010 noted raptor species made up of Turkey Vulture, Northern Harrier (*Circus cyaneus*), Red-tailed Hawk (*Buteo jamaicensis*), Ferruginous Hawk (*Buteo regalis*), Golden Eagle, American Kestrel (*Falco sparverius*), and Prairie Falcon.

Additional miscellaneous avian species observed during various biological surveys from 2009 to 2014 included the American Pipit (*Anthus rubescens*), Barn Swallow (*Hirundo rustica*), Violet-green Swallow (*Tachycineta thalassina*), Mountain Plover, Killdeer (*Charadrius vociferus*), Long-billed Curlew (*Numenius americanus*), Brewer's Blackbird (*Euphagus cyanocephalus*), Mourning Dove (*Zenaida macroura*), Barn Owl, Cooper's Hawk (*Accipiter cooperii*), Lesser Nighthawk (*Chordeiles acutipennis*), Western Kingbird (*Tyrannus verticalis*), Say's Phoebe (*Sayornis saya*), California Horned Lark (*Eremophila alpestris actia*), Rock Wren (*Salpinctes obsoletus*), Mountain Bluebird (*Sialia currucoides*), Hermit Thrush (*Catharus guttatus*), California Thrasher (*Toxostoma redivivum*), European Starling (*Sturnus vulgaris*), Savannah Sparrow (*Passerculus sandwichensis*), Lark Sparrow (*Chondestes grammacus*), Sagebrush Sparrow (*Artemisiospiza nevadensis*), White-crowned Sparrow (*Zonotrichia leucophrys*), Red-winged Blackbird (*Agelaius phoeniceus*), Tricolored Blackbird (*Agelaius tricolor*), Western Meadowlark (*Sturnella neglecta*), Yellow-rumped Warbler (*Setophaga coronata*), Lesser Goldfinch (*Spinus psaltria*), Great Egret (*Ardea alba*), California Quail (*Callipepla californica*), House Finch (*Haemorhous mexicanus*), and Purple Finch (*Carpodacus purpureus*).

4.0 AVIAN IMPACT ASSESSMENT (TIER 3)

This section outlines the potential risks to avian species and supports the implementation of avoidance and minimization measures and compensatory mitigation. There is not a significant amount of information pertaining to the impacts of PV solar energy developments on avian resources. Some components of solar development (overhead lines, transmission lines, project lighting) are common to other types of energy developments, and the mechanisms of bird impacts resulting from those project components may be applicable to solar energy development. Potential risks to avian species can be broken into several categories: lighting, collision, noise, electrocution and habitat loss.

4.1 Lighting

For avian species around a solar facility, increased lighting during low-light periods can cause some species to leave the area and can disrupt foraging, breeding, or other activities. The lighting from construction and O&M may disturb the nighttime rest and sleep periods of diurnal avian species, including most passerine birds, causing them to abandon nests that are otherwise undisturbed. Nest site selection by some avian species may also be affected by light, resulting in nests being established farther from light sources (Deda et. al., 2007 Longcore and Rich, 2004).

During construction, lighting will include lights from construction vehicles when construction occurs during nighttime hours, external lights on support buildings, down-shielded temporary lighting necessary for worker safety during nighttime construction. During operation of the Project, motion-sensor lighting will be used throughout the Project Footprint, constant lighting, at a low level, will be required at the O&M building, and truck lights associated with nighttime security and the panel washing, which may conducted at night. All lighting will point downward and be shielded to preserve dark skies. Given the lack of artificial night lighting in the area surrounding the Project Footprint prior to construction of the solar facility, the overall change in ambient lighting conditions could disturb the nesting and foraging activities of birds. However with the avoidance and minimization measures stated above, the effects of lighting should be reduced to less than significant levels.

Additionally, polarized light pollution has the potential for effects on habitat selection, egg laying foraging, navigation and orientation, predation, and population dynamics of numerous species (Horvath et al. 2009). Artificial surfaces such as the field of panels planned within the Project Footprint could reflect light and become polarization signals to which different species are attracted. The highly polarizing nature of solar panels may negatively affect the ability of animals to judge suitable habitats and egg laying sites, especially for organisms normally associated with water; artificial polarizing surfaces can be more attractive than water due to a stronger polarization signature. This can result in the attraction of insects which either waste resources (time and energy) on the surfaces, lay eggs on them resulting in reproductive failure, become easy targets for predators, or dehydrate and die (Horvath et al., 2009). Many insect families, including mayflies (*Ephemeroptera*), stoneflies (*Trichoptera*), dipterans, and horse and deer flies (*Tabanidae*) are very attracted to the polarized light reflected by solar panels and will lay eggs above solar panels more often than above water (Horvath et al. 2010).

This could have a negative effect if avian predators that are attracted by and feed on these insect, benefit from the abundance of prey attracted to these artificial surfaces, or become prey themselves. For instance, nest predators such as Common Raven that would gather near aquatic insect congregations that are attracted by the polarized light reflected by solar panels could represent an enhanced predatory risk for the eggs and chicks of other avian species that nest in the immediate vicinity of the Project such as California Horned Larks (Keller 2010). It is unknown the level of effect the polarization light pollution on insectivorous birds. PVS may be required to add additional avoidance, minimization or mitigative measures to reduce impacts to a less than significant level due to the results of the monitoring reports.

Furthermore, a large scale of the solar site such as the Project; could attract migrating avian species such as waterbirds (e.g. grebes, coots), resulting in lost migration time and energy, or potentially to injury, stranding, and death (Horvath et al., 2009). This collision risk will be discussed below in Section 4.2.

4.2 Collision

Avian interactions with transmission lines and panels and the risks those interactions impose vary greatly by location within the Project Footprint. Bird collisions with power lines generally occur when a power line or other aerial structure transects a daily flight path used by a concentration of

birds or migrants traveling at reduced altitudes (Brown, 1993). Collision rates generally increase in low light conditions; during inclement weather, such as rain or snow; during strong winds; and during panic flushes when birds are startled by a disturbance or are fleeing from danger. Collisions are more probable near wetlands, valleys that are bisected by power lines, and within narrow passes where power lines run perpendicular to flight paths.

Passerines (e.g., songbirds) and waterfowl (e.g., mallard ducks) are known to collide with wires (APLIC, 2006), particularly during nocturnal migrations or poor weather conditions (Avery et al., 1980). However, passerines and waterfowl have a lower potential for collisions than larger birds, such as raptors (e.g., Golden Eagle, Red-tailed Hawk) as some behavioral factors contribute to a lower collision mortality rate for these birds. Passerines and waterfowl tend to fly under power lines, while larger species generally fly over lines and risk colliding with higher static lines. Also, many smaller birds tend to reduce their flight activity during poor weather conditions (Avery et al., 1978). Due to the limited amount of overhead power lines proposed for the Project and the construction of those structures and lines will be in compliance with Avian Power Line Interaction Committee (APLIC) guidelines (2006), the effects of collision with power lines should be reduced to less than significant levels.

In addition to the collision risk to overhead power lines there is the possibility that the polarized glare or the "lake effect" that can occur with huge photovoltaic projects (Kagan et al. 2014). An open upland environment with a large expanse of reflective panels could emulate a large body of water. Avian species such as coots, grebes, and cormorants that utilize open water as their primary have been noted to land due to confusion of the solar panels with water within the (Kagan et al. 2014). This landing could lead to potential blunt force impact trauma or stranding from landing on artificial reflectors (Keller 2010).

PVS will conduct avian mortality studies on the Project Footprint (Section 6.0). The study would document the level of bird mortality and if the San Benito County and regulatory agencies deemed the mortality excessive, PVS would take corrective actions which may include up to the installation of non-polarizing white borders or white grids that break up the polarizing black surface of solar panels as noted in the Final Environmental Impact Report (FEIR) (County of San Benito 2010). The FEIR is available at http://www.cosb.us/Solargen/feir.htm.

4.3 Noise

Increased noise from heavy equipment, during construction and O&M activities could alter bird behavior (e.g., foraging, breeding) including disturbance that could lead to nest failure or abandonment. Noise sources from Project construction activities occurred throughout the Project Area due to use of construction equipment. The construction activities would include PV panel assembly, grading and recontouring, restoration of temporary construction, areas, support post, panel, electrical equipment installation, and access road construction.

Noise generated by the pile-driver (if used to set the panel foundation) and other heavy equipment is expected to exceed 90 dBA at 10 feet, and would be expected to result in temporary threshold shifts in hearing sensitivity. Threshold shifts could last for an extended period of time; loss of hearing could result in increased mortality as certain avian species relies on its ability to detect prey

by sound and communicate with conspecifics such as the Burrowing Owl. Noise and vibrations could also disrupt intraspecific communication and cause the owls to leave burrows, where they may be more susceptible to predation or proposed project-related injury or mortality (County of San Benito 2010).

Noise associated with construction activities may temporarily displace avian species from the Project Footprint and immediate vicinity or cause an impact to foraging efficiency than in the undisturbed habitat. It is possible that the disturbance caused by noise would result in direct take of an avian species due to noise impacts but due to Mitigation Measure BR-6.1 (Pre-construction Surveys for Nesting and Breeding Birds and Implementation of Avoidance Measures), BR-13.1 (Focused Pre-construction Burrowing Owl Surveys and Implementation of Avoidance Measures) and BR-16.2 (Minimize Impacts of Foundation Support Installations) of the FEIR (County of San Benito 2010), a direct impact seems unlikely.

Only minor and potentially insignificant noise from the proposed project during O&M would be created. This noise would be created by security patrols, maintenance crews, wash crews, and the sound of electrical equipment, such as the inverters and transformers. Security and maintenance staff would routinely traverse the site in lightweight vehicles and all-terrain vehicles. Panel washing crews would be scheduled to clean the panels twice per year. They would traverse the site in a small all-terrain vehicle which would be fitted with a trailer containing a water tank and pump to operate a high-pressure sprayer.

4.4 Electrocution

Avian species are known to be electrocuted by electrical power lines, energized substation/switchyard and interconnect structures found within the Project Footprint due to two known factors (APLIC 2005):

- Topography, vegetation, availability prey and other behavioral or biological factors.
- Inadequate separation between two energized conductors or and energized conductor and the grounding hardware.

Electrical utility lines could result in electrocution of avian species such as large raptors (e.g. eagles, hawks and owls) and members of the Family *Corvidae* (e.g. crows and ravens) that have wing-spans large enough to simultaneously contact two energized conductors or an energized conductor and grounded hardware . Furthermore, nests may be built in areas that are susceptible to electrical charges that could result in fire as well as an electrical outage. Therefore, any structures that allow for circuit completion pose an electrocution risk. Poles with energized hardware, such as transformers, can be especially hazardous, even to small birds, as they contain numerous, closely-spaced energized parts (APLIC 2006).

The biggest potential for electrocution to avian species on the Project Footprint will be from the energizing of the electrical substation and switchyard. The electrical substation will convert power from 34.5 kV to 230 kV. The substation will be located directly adjacent to the existing Pacific Electric and Gas (PG&E) transmission line. The substation output will be connected to a 230-kV

switching station which will be owned and operated by PG&E; the switching station will provide protective relays and breakers to manage interface with the 230-kV grid system.

To protect avian species from electrocution from electrical hardware within the electrical substation and switchyard and the small amount of overhead power lines on the Project Footprint as part of the construction and operations and maintenance, PVS will follow the APLIC guidelines established for electric line design (APLIC 2006). PVS will construct all transmission facilities, towers, poles and lines in accordance with and comply with all policies set forth in the *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (APLIC 2006), to avoid and/or minimize any avian electrocutions as a result of the construction and operation of the Project. Details of design components will be indicated on all construction plans and measures to comply with APLIC policies and guidelines will be detailed in a separate attachment to the construction plans, all of which will be submitted with the construction permit application. PVS will monitor for new versions of the APLIC guidelines and update designs or implement new measures as needed during the Project's construction provided these actions do not require the purchase of previously ordered transmission line structures. Therefore, with those measures in place, electrocution of any avian species including large raptors would be highly unlikely.

4.5 Habitat Loss

The construction and operation of the Project will result in modification of approximately 2,506 acres of habitat due to the construction and operation of the solar array complexes, an O&M building, a project perimeter road including emergency access and egress, electricity collection lines, DC-AC inverters, an electrical substation and switchyard. Breeding and wintering bird composition on the Project Footprint appears to be typical of densities found in annual brome grasslands of central California. The annual, non-native grassland habitat found within the Project Footprint that will be impacted is not significantly unique or limited on the landscape. Avian species should have other comparable or better breeding, foraging and roosting opportunities within the surrounding areas including the proposed conservation lands that will be protected through avoidance and minimization measures as well as conservation easements for compensatory mitigation of proposed impacts within the Project Footprint.

Upon the completion of construction, annual grassland vegetation will recover in interstitial spaces between arrays and along the project edges between arrays and the perimeter fence. In addition, annual vegetation will recover under panels that may be capable of supporting foraging and nesting activity by some species.

The implementation of avoidance and minimization measures (called Mitigation Measures in the FEIR) would reduce impacts to avian species due to habitat loss (San Benito County 2010).

The Project will also implement a conservation package consisting of the permanent preservation and management of three large parcels of land to offset potential habitat impacts totaling approximately 24,176 acres. These lands are the VFCL, VRCL, and SCRCL. These Conservation Lands will be enhanced and managed for the species through implementation of a Conservation Management Plan. The lands were selected to provide local mitigation for habitat losses, preserve

core populations of special status species and create permanent movement corridors with adjacent BLM controlled lands.

With the protection of these conservation lands, PVS shall compensate for permanent impacts to foraging and nesting habitat for avian species with the creation of permanent conservation easements. Conservation easements shall provide habitat preservation. Preserved habitat shall be of equal or greater quality after any restoration activity compared to the impacted habitat within the Project Footprint. This mitigation may occur on lands used simultaneously as mitigation for impacts to other species.

4.6 Potential Impacts to Special Status Avian Species

The Project area provides potential habitat for cover, breeding, foraging for 15 special status bird species (Section 3.3.1, Table 1). Of those 15 species, there is the potential for 13 of those species to use the Project Footprint for nesting and foraging. Those species are: Mountain Plover, Golden Eagle, California Condor (*Gymnogyps californianus*), Burrowing Owl, Tricolored Blackbird, Grasshopper Sparrow, Short-eared Owl, Long-eared Owl (*Asio otus*), Swainson's Hawk (*Buteo swainsonii*), Northern Harrier, White-tailed Kite (*Elanus leucurus*), Loggerhead Shrike, and Oregon Vesper Sparrow (*Pooecetes gramineus affinis*).

4.6.1 Mountain Plover

Nearly the entire 2,506 acre Project Footprint provides suitable wintering habitat for Mountain Plovers. The Panoche Valley is an important wintering area for Mountain Plovers in central California. Due to impacts to Mountain Plover habitat, PVS will provide compensatory mitigation for permanent impacts to habitat for wintering Mountain Plovers with the creation of permanent conservation easements (Conservation Lands). Some of the approximately 24,176 acres of high quality Conservation Lands will provide habitat preservation in perpetuity at or above a ratio of 1:1 for wintering habitat acreage subject to impacts associated with construction of the Project. Preserved habitat shall be occupied and be of equal or greater quality after any restoration activity compared to the impacted habitat. This mitigation may occur on lands used simultaneously as mitigation for impacts to other species.

Therefore, any potential for injury, mortality, or disturbance, or loss or degradation of wintering foraging habitat as a result of permanent or temporary construction-related activities would constitute a potential impact to the Mountain Plover. However, implementation of Mitigation Measures noted in Sections 4.6.4 and 4.6.5 as well as other avoidance and minimization measures (Section 5.0) would reduce potential impacts to Mountain Plovers to less than significant levels.

4.6.2 Golden Eagle

Based on the point count, UDA, and aerial nesting survey information noted in Section 3.4.1 and incidental observations, it is apparent that Golden Eagles forage in and around the Panoche Valley throughout the year. The overall activity levels within the Project Footprint appear low with a majority of the activity taking place on adjacent conservation lands with significant slopes and elevations ranging from approximately 1,400 feet to 2,100 feet amsl. Additionally, as found during

the point count and the UDA studies, unless there is an attractant (i.e. food, carcass) found within the Project Footprint and the VFCL, the Golden Eagles usage of the site is nominal. The UDA study also indicated that the Golden Eagles are mostly flying across or through the Panoche Valley (i.e. Project Footprint/VFCL) to other habitats to forage or perch.

Furthermore, the 2010 aerial nesting study identified no Golden Eagle nests within two miles of the Project Footprint. In 2014, the nesting study identified no Golden Eagle nests within three miles of the Project Footprint. The next closest active Golden Eagle nest to the Project in 2014 was located approximately 5.79 miles north-northwest of the Project Footprint.

PVS will adhere to the avoidance measures and conservation approach described below. The construction and operation and maintenance avoidance and minimization measures are expected to result in the avoidance of direct effects to Golden Eagles during construction and long-term operations. Furthermore, the proposed compensatory mitigation as stated below will ensure that any impacts to Golden Eagle foraging habitat is mitigated to the approved ratio determined by the appropriate state and federal agencies. With implementation of these measures and particularly the compensatory mitigation, effects will be avoided, minimized, and mitigated, resulting in no net loss to the Golden Eagle population in the vicinity of the Project.

Therefore, PVS shall compensate for permanent impacts to habitat for foraging Golden Eagles with the protection through the recording of easements for the Conservation Lands. The Conservation Lands will provide habitat preservation, in perpetuity at a ratio of 2:1 or greater for all impacted Golden Eagle foraging habitat impacted. Preserved habitat shall be of equal or greater quality after any restoration activity compared to the impacted habitat. This mitigation may occur on lands used simultaneously as mitigation for impacts to other species. In addition, the implementation of Mitigation Measures as well as other avoidance and minimization measures (Section 5.0) would reduce potential impacts to Golden Eagles to less than significant levels.

4.6.3 California Condor

No California condors have been observed in or near the Project Footprint during any surveys, though USFWS radio-tracking efforts have recorded California condors over the Project Footprint and/or Conservation Lands in the past. The Project Footprint contains 2,506 acres of potential foraging habitat for the California condors which would be impacted permanently as the result of Project implementation. The Project Footprint is surrounded by potential foraging habitat; the loss of this foraging habitat is so small compared to the remaining available habitat that it would not noticeably have an impact on the California condors. The Project Footprint does not contain suitable nesting habitat for California condors.

The Conservation Lands (including the VFCL, VRCL and SCRCL) represent 24,176 acres of potential foraging habitat for the California condors that would be preserved in perpetuity. There is no suitable nesting habitat for the condor on any of the Conservation Lands. Should a condor land within the Project Footprint or Valley Floor Conservation Lands, all work shall be stopped within 500 feet of the condor until the bird has left the area on its own. If the bird fails to leave the area because of injury or other factors PVS shall contact the USFWS, CDFW and/or San Benito County for direction. Should a condor(s) be incidentally observed roosting within 0.5 miles of the construction

area, no construction activity shall occur within 0.5 miles of the observation between one hour before sunset to one hour after sunrise, or until the condor(s) leave the area. Should condors be found nesting (December through September) (USFWS 1996) within 1.5 miles of the construction area, no construction activity will occur within 1.5 miles of the nest until further authorization from the USFWS. All California condor sightings shall be reported directly to the USFWS/CDFW and San Benito County within 24 hours of the observation by the Project's Environmental Manager or County-approved biologist.

Any Project-related electric distribution and substation structures will be constructed using APLIC-based avian protection guidelines. The APLIC-based avian protection guidelines are designed to reduce the operational and avian risks that result from avian interactions with electric utility facilities. However, should a condor land within the Project Footprint or immediately adjacent, all work shall be stopped within 500 feet of the condor until the bird has left the area on its own. If the bird fails to leave the area because of injury or other factors PVS shall contact the USFWS /CDFG and County for direction. All California condor sightings in the Project Footprint and/or Conservation Lands shall be reported by the Project's Environmental Manager or County-approved biologist directly to the USFWS/CDFG and County within 24 hours. Therefore, with the implementation of Mitigation Measures stated in the FEIR (San Benito County 2010) as well as other avoidance and minimization measures (Section 5.0) potential impacts to condors would be reduced to less than significant levels.

4.6.4 Burrowing Owl

Nearly the entire 2,506 acres Project Footprint provides suitable foraging, nesting, and roosting habitat for Burrowing Owls. Numerous observations of Burrowing Owls have been made within the Project Footprint and Conservation Lands, and there are several CNDDB (2014) records of Burrowing Owls within a 10-mile radius of the Project Footprint. There are clusters of California ground squirrel (*Spermophilus beecheyi*) burrows are present on the Project Footprint that are suitable for Burrowing Owl use, primarily near water sources and along roads.

The loss of occupied Burrowing Owl habitat and the loss of individuals (including eggs or young) as a result of construction, or O&M activities could be a significant impact to this species in the Panoche Valley. Open grasslands that recover in suitable interstitial spaces between arrays and along the project perimeter will provide suitable habitat for this species during the operations phase. Avoidance and minimization measures noted in Section 5.0 and the Mitigation Measures found in the FEIR (San Benito County 2010) for the Burrowing Owl and other species will avoid, minimize, and mitigate for any negative effects on the owl. The Mitigation Measures include:

1. All construction personnel participate in the Worker Environmental Education Program (WEEP);
2. Best Management Practices (BMPs) for biological resources are implemented;
3. A Habitat Restoration and Revegetation Plan is developed and implemented;
4. Biological construction monitoring is implemented;
5. Conservation easements are created for permanent habitat protection as appropriate;

6. A Habitat Mitigation and Monitoring Plan (HMMP) is developed and implemented for mitigation lands;
7. A fugitive dust reduction plan will be developed; and
8. Focused pre-construction Burrowing Owl surveys and species specific avoidance measures will be completed

Pre-construction surveys; implementation of avoidance zones during the breeding season (February 1st to August 31st) and non-breeding season; and passive relocation efforts during the non-breeding season (under the approval of CDFW) all reduce the likelihood of impact for this species of special concern. In addition, post-construction monitoring efforts will continue to document presence on the Project Footprint. Minimization and avoidance measures are based on those outlined in CDFW's March, 2012 report *Staff Report on Burrowing Owl Mitigation*. These avoidance measures include:

- Avoid disturbing occupied burrows during the nesting period, from 1 February through 31 August.
- Avoid impacting burrows occupied during the non-breeding season by migratory or non-migratory resident Burrowing Owls.
- Develop and implement a worker awareness program to increase the on-site worker's recognition of and commitment to Burrowing Owl protection.
- Place visible markers near occupied burrows to ensure that equipment and other machinery do not collapse the occupied burrows.
- Do not fumigate, use treated bait or other means of poisoning nuisance animals in areas where Burrowing Owls are known or suspected to occur (e.g., sites observed with nesting owls, designated use areas).

No more than 30 days prior to the commencement of initial ground disturbing activities PVS shall conduct pre-construction reconnaissance level surveys focused solely on Burrowing Owls. Surveys shall be conducted prior to the initiation of ground disturbance and be conducted by a County-approved biologist(s) or biological monitors under the direct supervision of a County-approved biologist with experience surveying for Burrowing Owls. The focused surveys for Burrowing Owls shall be conducted in conformance with the California Burrowing Owl Consortium's most recent protocols. Surveys shall be completed within all areas proposed for ground disturbance and shall include the following avoidance measures:

- Occupied burrows shall not be disturbed during the nesting season (1 February through 31 August) unless a County-approved biologist verifies through non-invasive methods that either the birds have not begun egg-laying and incubation or that juveniles from the occupied burrows are foraging independently and are capable of independent survival. Owls present on site after February 1st will be assumed to be nesting unless evidence indicates

otherwise. A 250-foot exclusion buffer around any active nest would be erected. This protected buffer area will remain in effect until August 31st, or based upon monitoring evidence, until the young owls are foraging independently or the nest is no longer active (Table 3).

- For Burrowing Owls present during the non-breeding season (generally September 1st to January 31st), a 150 feet buffer zone will be maintained around the occupied burrow(s) (Table 3).
- If there is any danger that owls will be injured or killed as a result of construction activity, during the non-breeding season, the birds may be passively relocated during the non-breeding season. Relocation of owls during the non-breeding season will be performed by a County-approved biologist using one-way doors, which should be installed in all burrows within the impact area and left in place for at least two nights. These one-way doors will then be removed and the burrows excavated to ensure no Burrowing Owl is within the burrow and then backfilled immediately prior to the initiation of grading. To avoid the potential for owls evicted from a burrow to occupy other burrows within the impact area, one-way doors will be placed in all potentially suitable burrows within the impact area when eviction occurs.

Table 3. Buffer zones associated with the Burrowing Owl at the Project Footprint

BURROWING OWL RESOURCE	RADIUS OF BUFFER ZONE
Occupied Burrowing Owl (breeding season)	76.2 meter (250 feet)
Occupied Burrowing Owl Burrows (non-breeding season)	45.7 meter (150 feet)

In addition, PVS will compensate for permanent impacts to Burrowing Owls or their habitat through the recording of easements for the Conservation Lands (24,176 acres). The Conservation Lands will be of equal or greater habitat quality after any restoration activity compared to the affected habitat. In accordance with California Burrowing Owl Consortium (1995) guidelines, an area of 6.5 acres per pair will be preserved and managed for this species. This mitigation may occur on lands used simultaneously as mitigation for impacts to other species. Given the habitat requirements for several of the Covered Species overlaps with burrowing owl, separate management activities would not be necessary. Therefore, with the implementation of Mitigation Measures as well as other avoidance and minimization measures (Section 5.0); potential impacts to Burrowing Owls would be reduced to less than significant levels.

4.6.5 Tricolored Blackbird

Tricolored Blackbirds have been observed (non-breeding observation) on the Proposed Project site and suitable foraging habitat for Tricolored Blackbirds is present throughout, although nesting habitat (i.e., cattail marshes, blackberry thickets, thistle stands) is absent. A large Tricolored

Blackbird colony is known to occur approximately eight miles north of the Project Footprint at Little Panoche Reservoir (CNDDB, 2014).

These blackbirds could forage in all areas of the Proposed Project site and could be directly affected by the construction of the solar arrays, buildings, substation, and other infrastructure or activities. Therefore, the Project has the potential to impact Tricolored Blackbirds foraging habitat. Incidental observations made during previous field surveys, confirmed the presence of potentially foraging Tricolored Blackbirds within the Project Footprint/Conservation Lands (County of San Benito 2010). Due to the extent of suitable foraging habitat, the overlap of the species' ranges with the Panoche Valley, and historic (CNDDB 2014) records, it appears that the Project Footprint is part of a larger annual grassland area within the Panoche Valley that is used as foraging habitat by Tri-Colored Blackbirds.

Any injury, mortality, or a substantial loss or degradation of foraging habitat as a result of permanent or temporary construction-related activities would constitute an impact to the Tricolored Blackbird. Implementation of Mitigation Measures found in the FEIR (San Benito County 2010) which are noted above in Section 4.6.4 and the additional mitigation measure that requires PVS to retain a qualified, County-approved Designated Biologist to conduct pre-construction surveys for non-breeding birds designated as California Species of Special Concern (BR-7b.1 of the FEIR) in areas proposed for ground disturbance prior to ground-disturbing activities would result in avoidance and minimization of potential impacts to Tricolored Blackbirds that may forage on the Project Footprint. With the implementation of these mitigation measures as well as other avoidance and minimization measures (Section 5.0), potential impacts to Tricolored Blackbirds would be reduced to less than significant levels within the Project Footprint.

4.6.6 Grasshopper Sparrow

The grassland habitats of the Project Footprint are heavily grazed, and therefore generally lack the heterogeneous structure this species typically prefers. However, suitable conditions may occur within the Proposed Project site during some years, especially following periods of above average rainfall. Grasshopper Sparrows are known to have nested in the Proposed Project vicinity (National Audubon Society 2013) and the Panoche Valley Solar Project is within the range of this species. Although Grasshopper Sparrows could occur on the Project Footprint or Conservation Lands, there are no CNDDB (2014) records of them occurring with a 10-mile radius of the Project Footprint. Biological surveys conducted on the Project Footprint and Conservation Lands from 2009 through 2014, did not detect Grasshopper Sparrows.

Any potential for injury, mortality, or disturbance (particularly of nesting Grasshopper Sparrows), or loss or degradation of nesting or foraging habitat as a result of permanent or temporary construction-related activities would constitute a potentially impact to the Grasshopper Sparrow. With the implementation of Mitigation Measures noted in Sections 4.6.4 and the additional mitigation measure that requires PVS to retain a qualified, County-approved Designated Biologist to conduct pre-construction surveys for nesting and breeding birds (BR-6.1 of the FEIR) and pre-construction surveys for non-breeding birds designated as California Species of Special Concern (BR-7b.1 of the FEIR) in areas proposed for ground disturbance, prior to ground-disturbing activities that would result in potential impacts to Grasshopper Sparrows on the Project Footprint. With the

implementation of these mitigation measures as well as other avoidance and minimization measures (Section 5.0), potential impacts to Grasshopper Sparrows would be reduced to less than significant levels within the Project Footprint.

4.6.7 Short-Eared Owl

Short-eared Owls require open country that supports concentrations of rodents (e.g. voles) and adequate herbaceous cover to conceal their ground nests from predators. Suitable habitats may include irrigated alfalfa or grain fields, ungrazed grasslands and old pastures (Shuford 2008). The grassland habitats of the Project Footprint are heavily grazed, and therefore generally lacking the structure this species typically prefers for nesting. However, suitable conditions may occur within the Project Footprint during some years, especially in response to vole population irruptions following exceptional rain years (Shuford 2008). Conditions on the Project Footprint or Conservation Lands on the site are more xeric than short-eared owls prefer during most years. Although Short-eared Owl could occur on the Project Footprint or Conservation Lands, there are no CNDDB (2014) records of them occurring with a 10-mile radius of the Project Footprint. Biological surveys conducted on the Project Footprint and Conservation Lands from 2009 through 2014, did not detect Short-eared Owls.

With the implementation of Mitigation Measures noted in Sections 4.6.4 and the additional mitigation measure that requires PVS to retain a qualified, County-approved Designated Biologist to conduct pre-construction surveys for nesting and breeding birds (BR-6.1 of the FEIR) and pre-construction surveys for non-breeding birds designated as California Species of Special Concern (BR-7b.1 of the FEIR) in areas proposed for ground disturbance, prior to ground-disturbing activities that would result in potential impacts to Short-eared Owls on the Project Footprint. With the implementation of these mitigation measures as well as other avoidance and minimization measures (Section 5.0), potential impacts to Short-eared Owls would be reduced to less than significant levels within the Project Footprint.

4.6.8 Long-Eared Owl

Long-eared Owls prefer to nest in conifer, oak, riparian, pinyon-juniper, and desert woodlands that are open or are adjacent to grasslands, meadows, or shrublands. Key habitat components are some dense cover for nesting and roosting, suitable nest platforms, and open foraging areas (Shuford 2008). Suitable foraging habitat for long-eared owls is present throughout the Project Footprint, although only marginally suitable nesting habitat is present in the few trees associated with structure or small *Eucalyptus* sp. groves planted for shading of cattle. Long-eared Owls have been observed nesting approximately three miles north of the Project Footprint at Mercy Hot Springs. The Panoche Valley is within the range of this species and they could forage on the Project Footprint, however, nesting is unlikely. No observations of Long-eared Owls have been made during any biological surveys conducted on the Project Footprint or adjacent Conservation Lands from 2009 to 2014.

Any potential for injury, mortality, or disturbance (particularly of nesting Long-eared owls), or loss or degradation of habitat as a result of permanent or temporary construction-related activities would constitute a potentially significant impact to the Long-eared Owl. With the implementation of

Mitigation Measures noted in Sections 4.6.4 and the additional mitigation measure that requires PVS to retain a qualified, County-approved Designated Biologist to conduct pre-construction surveys for nesting and breeding birds (BR-6.1 of the FEIR) and pre-construction surveys for non-breeding birds designated as California Species of Special Concern (BR-7b.1 of the FEIR) in areas proposed for ground disturbance, prior to ground-disturbing activities that would result in potential impacts to Long-eared Owls on the Project Footprint. With the implementation of these mitigation measures as well as other avoidance and minimization measures (Section 5.0), potential impacts to Long-eared Owls would be reduced to less than significant levels within the Project Footprint.

4.6.9 Swainson's Hawk

The Swainson's Hawk breeds in the western United States and Canada and winters in South America as far south as Argentina. The hawk is adapted to the open grasslands, it has become increasingly dependent on agriculture, especially alfalfa crops, as native communities are converted to agricultural lands. Nearly the entire 2,506 acres Project Footprint could provide suitable foraging habitat for Swainson's Hawks. Three small *Eucalyptus* sp. stands present on the Project Footprint represent marginal potential nesting habitat. The trees in these stands are not mature and this species of hawk does not typically select eucalyptus as nest sites. The most recent status surveys did not locate any Swainson's Hawk nests in San Benito County and indicated on range maps that the Panoche Valley is outside of the current known range for the species, although the Panoche Valley is in the historic range (Anderson et. al. 2007). Additional potentially suitable nest trees are found outside the Project Footprint. If Swainson's Hawks were to nest in the vicinity, they could use the site for foraging. This hawk migrates to South America for the winter. Swainson's Hawks have not been detected during any biological surveys conducted on the Project Footprint or Conservation Lands from 2009 and 2014 including the aerial nesting surveys completed in 2010 and 2013/2014 and no CNDDB observations of this hawk species within over three miles of the Project Footprint (CNDDB, 2014).

Any potential for injury, mortality, or disturbance (particularly of nesting Long-eared owls), or loss or degradation of habitat as a result of permanent or temporary construction-related activities would constitute a potentially significant impact to the Swainson's Hawk. With the implementation of Mitigation Measures noted in Sections 4.6.4 and the additional mitigation measure that requires PVS to retain a qualified, County-approved Designated Biologist to conduct pre-construction surveys for nesting and breeding birds (BR-6.1 of the FEIR) and pre-construction surveys for non-breeding birds designated as California Species of Special Concern (BR-7b.1 of the FEIR) in areas proposed for ground disturbance, prior to ground-disturbing activities that would result in potential impacts to Swainson's Hawks on the Project Footprint. With the implementation of these mitigation measures as well as other avoidance and minimization measures (Section 5.0), potential impacts to Swainson's Hawks would be reduced to less than significant levels within the Project Footprint.

4.6.10 Northern Harrier

Northern Harriers breed and forage in a variety of open, treeless habitats that provide a sufficient vegetative cover, an abundance of preferred prey. In California, harriers can be found in freshwater marshes, brackish and saltwater marshes, wet meadows, weedy borders of lakes, rivers and streams, annual and perennial grasslands (including those with vernal pools), weed fields, ungrazed

or lightly grazed pastures, some croplands, sagebrush flats, and desert sinks. Northern harriers require adequate herbaceous cover to conceal their ground nests from predators typically, patches of dense, often tall, vegetation in undisturbed areas (Shuford 2008).

Nearly the entire 2,506 acres Project Footprint currently provides suitable foraging habitat for Northern Harriers due to observations of harriers foraging over the Project Footprint and Conservation Lands. However, the grassland habitats of the Project Footprint are heavily grazed, and therefore generally lacking the structure this species typically prefers for nesting. However, suitable conditions for nesting could occur within the Project Footprint during some years following exceptional rain years (Shuford 2008) with altered grazing management. As stated previously, Northern Harriers have been detected foraging on the Project Footprint and Conservation Lands, but no nesting Northern Harriers have been observed during any biological surveys conducted on the Project Footprint or Conservation Lands from 2009 and 2014 including the aerial nesting surveys completed in 2010 and 2013/2014.

Any potential for injury, mortality, or disturbance (particularly of nesting Northern Harriers), or loss or degradation of habitat as a result of permanent or temporary construction-related activities during the right conditions would constitute a potentially impact to the Northern Harrier. With the implementation of Mitigation Measures noted in Sections 4.6.4 and the additional mitigation measure that requires PVS to retain a qualified, County-approved Designated Biologist to conduct pre-construction surveys for nesting and breeding birds (BR-6.1 of the FEIR) and pre-construction surveys for non-breeding birds designated as California Species of Special Concern (BR-7b.1 of the FEIR) in areas proposed for ground disturbance, prior to ground-disturbing activities that would result in potential impacts to Northern Harriers on the Project Footprint. With the implementation of these mitigation measures as well as other avoidance and minimization measures (Section 5.0), potential impacts to Northern Harriers would be reduced to less than significant levels within the Project Footprint.

4.6.11 White-Tailed Kite

The White-tailed Kite is found in California throughout the year associated with coastal and valley lowlands where it is mostly found foraging and nesting near agricultural areas. This kite needs substantial groves of dense, broad-leafed deciduous trees used for nesting and roosting (Zeiner et. al. 1990). Some of the 2,506 acre Project Footprint or nearby properties could be considered foraging habitat for White-tailed Kites. However, a majority of the grassland habitats of the Project Footprint and Conservation Lands are heavily grazed, and therefore lack the preferred habitat for foraging and any nearby structure this species typically prefers for nesting with the exception of some riparian areas along Silver and Panoche Creeks in the SCRCL. Furthermore, no observations of White-tailed Kites foraging over the Project Footprint, Conservation Lands or in its immediate vicinity during any biological surveys conducted on the Project Footprint or Conservation Lands from 2009 and 2014 including the aerial nesting surveys completed in 2010 and 2013/2014. In addition, there have been no CNDDB observations of White-tailed Kites within 10 miles of the site (CNDDB, 2014).

Any potential for injury, mortality, or disturbance (particularly of nesting White-tailed Kites), or loss or degradation of habitat as a result of permanent or temporary construction-related activities

during the right conditions would constitute a potentially significant impact to the White-tailed Kite. With the implementation of Mitigation Measures noted in Sections 4.6.4 and the additional mitigation measure that requires PVS to retain a qualified, County-approved Designated Biologist to conduct pre-construction surveys for nesting and breeding birds (BR-6.1 of the FEIR) and pre-construction surveys for non-breeding birds designated as California Species of Special Concern (BR-7b.1 of the FEIR) in areas proposed for ground disturbance, prior to ground-disturbing activities that would result in potential impacts to White-tailed Kites on the Project Footprint. With the implementation of these mitigation measures as well as other avoidance and minimization measures (Section 5.0), potential impacts to White-tailed Kites would be reduced to less than significant levels within the Project Footprint.

4.6.12 Loggerhead Shrike

Suitable foraging habitat for Loggerhead Shrikes is present throughout the Project Footprint, and there is abundant prey for this species (e.g. small lizards, grasshoppers); however, only marginally suitable nesting habitat is present in the few trees associated with structures on or adjacent to the Project Footprint. Shrubs that may be used by this species are not present on the Project Footprint, but are abundant on Conservation Lands. This species could occur in all areas of the Project Footprint and could be directly affected by the construction of the solar arrays, buildings, substation, and other infrastructure or activities. Therefore, the Project has the potential to impact Loggerhead Shrikes, impede their movement, and alter occupied habitat. Field surveys have confirmed the presence of Loggerhead Shrikes within the Project Footprint and adjacent Conservation Lands.

Any potential for injury, mortality, or disturbance (particularly of nesting Loggerhead Shrikes), or loss or degradation of habitat as a result of permanent or temporary construction-related activities would constitute a potentially significant impact to the Loggerhead Shrike. With the implementation of Mitigation Measures noted in Sections 4.6.4 and the additional mitigation measure that requires PVS to retain a qualified, County-approved Designated Biologist to conduct pre-construction surveys for nesting and breeding birds (BR-6.1 of the FEIR) and pre-construction surveys for non-breeding birds designated as California Species of Special Concern (BR-7b.1 of the FEIR) in areas proposed for ground disturbance, prior to ground-disturbing activities that would result in potential impacts to Loggerhead Shrikes on the Project Footprint. With the implementation of these mitigation measures as well as other avoidance and minimization measures (Section 5.0), potential impacts to Loggerhead Shrikes would be reduced to less than significant levels within the Project Footprint.

4.6.13 Oregon Vesper Sparrow

The Oregon Vesper Sparrow is considered an obligate grassland species that feeds on both invertebrates and seeds procured on the ground and in vegetation (Shuford 2008). The habitat of Oregon vesper sparrows wintering in California is mainly open ground with little vegetation or grown to short grass and low annuals, including stubble fields, meadows, and road edges (Shuford 2008). Suitable winter foraging habitat is present throughout the Project Footprint and the Conservation Lands. Although Oregon Vesper Sparrow could occur on the Project Footprint and Conservation Lands, there are no CNDDB (2014) records of them occurring with a 10-mile radius of

the Project Footprint. Biological surveys conducted on the Project Footprint and Conservation Lands from 2009 through 2014, did not detect Oregon Vesper Sparrow. However, the results of the Audubon Society's Christmas Bird Count in the Panoche Valley from 2003 through 2011 did indicate Vesper Sparrows (*Pooecetes gramineus*) but did not indicate the subspecies. These observations could very well be Oregon Vesper Sparrows.

Any potential for injury, mortality, or disturbance, or loss or degradation of wintering foraging habitat as a result of permanent or temporary construction-related activities would constitute a potentially significant impact to the Oregon Vesper Sparrow. With the implementation of Mitigation Measures noted in Sections 4.6.4 and the additional mitigation measure that requires PVS to retain a qualified, County-approved Designated Biologist to conduct pre-construction surveys for non-breeding birds designated as California Species of Special Concern (BR-7b.1 of the FEIR) in areas proposed for ground disturbance, prior to ground-disturbing activities that would result in potential impacts to Oregon Vesper Sparrows on the Project Footprint. With the implementation of these mitigation measures as well as other avoidance and minimization measures (Section 5.0), potential impacts to Oregon Vesper Sparrows would be reduced to less than significant levels within the Project Footprint.

4.7 Cumulative Impacts

Analysis of cumulative effects typically considers the effects of a proposed project in combination with the effects of past, present, and reasonably foreseeable projects. To date, no other solar projects have been built in the vicinity of the Panoche Valley Solar Project and to the knowledge of PVS; no solar facilities are planned for construction in the future. However, if in the future a solar facility is planned in the vicinity of the Panoche Valley Solar Project, that project will be subject to the same regulations, and will be required to ensure that their effects on avian species are avoided, minimized, and mitigated. Therefore, the cumulative effects on avian species in the general vicinity, directly or indirectly would be considered less than significant.

5.0 AVOIDANCE, MINIMIZATION, AND MORTALITY REDUCTION MEASURES

This section identifies minimization and mortality measures that will be incorporated during construction and O&M of the Project.

5.1 General Avoidance and Minimization Measures

PVS will implement the following best management practices (BMPs) and avoidance and minimization measures in order to minimize potential impacts on avian species. Many of these measures are also described in the FEIR for the Panoche Valley Solar Project.

1. Before commencing on-site construction activities, PVS will submit to CDFW and USFWS, the name, qualifications, business address, and contact information of one or more County-approved biologists. The Permittee shall ensure that each County-approved biologist is knowledgeable and experienced in the biology, and natural history of the special status

avian species that could occur on the Project. The County-approved biologist(s) shall be responsible for monitoring construction activities to minimize and fully mitigate or avoid the take of avian species and to minimize disturbance of foraging habitat. The County-approved biologist may appoint biological monitors to perform biological surveys or provide oversight of ground disturbing activities as needed in their place. All biological monitors that work on-site will receive instruction from and report to the County-approved biologist(s).

2. Prior to surface disturbance or other covered activity, a County-approved biologist shall conduct a special status species education program (tailgate briefing) for all Project personnel, which familiarizes the PVS employees and contractors with occurrence and distribution of special status species in areas impacted by the Project; take avoidance measures being implemented during the Project; and BMPs. This program is designed to ensure all personnel who work at the Project are aware of and can identify the avian special status species and the measures implemented to protect this species. An employee environmental awareness program will be administered to all new employees and to all other employees every two years. Upon completion of the program, the employees are given a badge that is required for admittance onto the Project site. Badges will include the employee's picture and will be color-coded and dated in order to show that the employee is current with required training.

3. Posters showing pictures of protected avian species (e.g. Golden Eagles and Burrowing Owls) with information and protocols to be followed will be placed in conspicuous locations (e.g. construction trailers). Verbiage will be in English and Spanish.

4. Prior to surface disturbance or other covered activity, PVS will conduct pre-construction surveys for non-breeding birds designated as California Species of Special Concern. PVS shall retain a County-approved biologist to conduct pre-construction surveys for avian species designated as California Species of Special Concern in areas proposed for ground disturbance prior to ground-disturbing activities. The timing of surveys shall be determined in consultation with CDFW.

5. Prior to surface disturbance or other covered activity, PVS will conduct pre-construction surveys for nesting and breeding birds and implementation of avoidance measures. Prior to any on-site any site disturbance (i.e., mobilization, staging, grading or construction) during the breeding season for any birds that could occur on the Project Footprint, the PVS shall retain a County-approved qualified biologist to conduct pre-construction surveys for nesting birds. Surveys for nesting birds shall be conducted within the recognized breeding season in all areas within 500 feet of solar arrays, staging areas, substation sites, and access road locations. Surveys for raptors shall be conducted for all areas between February 1 and August 15. The required survey dates may be modified based on local conditions, as determined by the County-approved biologist, with the approval of the County of San Benito.

6. If breeding birds (non-raptors) with active nests (incubating eggs or fledging young) are found prior to or during construction, a biological monitor, under the supervision of a County-approved biologist, shall establish a 300-foot buffer around the nest for ground-

based construction activities and no activities will be allowed within the buffer(s) until the young have fledged from the nest or the nest fails. If raptors with active nests are found, a 500-foot buffer for raptors will be placed around the nest until the young have fledged the nest or the nest is deemed to have failed. If nesting Golden Eagles are identified, a 0.5-mile no activity buffer will be implemented. The exception to these stated buffers is clarified below in Section 6.1 of this document.

7. A County-approved biologist or a biological monitor shall be present while ground-disturbing activities are occurring. In addition to conducting preconstruction surveys, the biologist(s) shall aid crews in satisfying "take" avoidance criteria and implementing mitigation measures; will document (weekly) all pertinent information concerning Project effects on protected avian species; and shall assist in minimizing the adverse effects of Project activities on protected avian species.

8. PVS shall appoint a company representative (Environmental Manager) who will be the contact source for any employee or contractor who inadvertently kills or injures a protected avian species or who finds a dead, injured, or entrapped protected avian species. The representative will be identified during the pre-performance educational briefing.

9. County-approved biologists and biological monitors are empowered to order cessation of activities if take avoidance and/or mitigation measures are violated and will notify the Environmental Manager immediately.

10. Unless County-approved biologist(s) allow alterations to routes, all Project vehicles shall be confined to designated project roads or prominently staked and/or flagged access routes that are surveyed prior to use.

11. Any project-related electric distribution and substation structures will be constructed using APLIC-based avian protection guidelines (2006). The APLIC-based avian protection guidelines are designed to reduce the operational and avian risks that result from avian interactions with electric utility facilities and avoid and reduce potential impacts to birds during construction, O&M, and decommissioning of the Project.

12. New light sources will be minimized, and lighting will be designed (e.g., using downcast lights) to limit the lighted area to the minimum necessary.

13. As stated in Section 4.6.3, PVS will avoid and report California Condors found within the Project Footprint or Valley Floor Conservation Lands. Should a condor land within the Project Footprint or VFCL, all work shall be stopped within 500 feet of the condor until the bird has left the area on its own. If the bird fails to leave the area because of injury or other factors PVS shall contact the USFWS/CDFW and San Benito County for direction. Should condors be found roosting within 0.5 miles of the construction area, no construction activity shall occur within 0.5 miles of the observation between one hour before sunset to one hour after sunrise, or until the condor(s) leave the area. Should condors be found nesting (December through September) (USFWS 1996) within 1.5 miles of the construction area, no construction activity will occur within 1.5 miles of the nest until further authorization from

the USFWS. All California condor sightings shall be reported directly to the USFWS/CDFW and San Benito County within 24 hours of the observation by the Project's Environmental Manager or County-approved biologist.

14. The County-approved biologist(s) shall keep an accurate tally of the number of sensitive avian resources that are affected by construction activities. Additionally, biologist(s) shall estimate the number of nest damaged, relocated, or nest that were deemed by the County-approved biologist to have abandoned/failed due to construction activities. Total number of nests affected (e.g. nest damaged, relocated, abandoned/failed) by the construction shall be reported in the post-activity compliance reports and entered into a central database developed expressly for that purpose.

15. Any contractor, employee(s), or other personnel who inadvertently kills or injures any avian species, including state and federal endangered, threatened, species of concern or state fully protected, shall immediately report the incident to the Environmental Manager or County-approved biologist. In the case of a protected species, the Environmental Manager or County-approved biologist will contact CDFW and/or USFWS immediately in the case of a dead, injured, or entrapped listed avian species. The CDFW contact for immediate assistance is State Dispatch at (916) 445-0045. State Dispatch will contact the local warden or biologist. The County-approved biologist will also document all circumstances of death, injury or entrapment of protected avian species. The County-approved biologist will: 1) take all reasonable steps to enable the individual animal to escape should it be entrapped; 2) contact CDFW, USFWS or other appropriate authorities to identify an approved rehabilitation center and appropriate capture and transport techniques should the covered animal be injured; and 3) document circumstances of death in writing and if possible photograph the dead animal in situ prior to moving (the animal will only be moved with permission from the applicable agencies).

16. If a protected avian species is injured or take occurs from Project-related activities during construction or operations, the County-approved biologist shall be immediately notified and initial notification shall be made to CDFW by calling the Regional Office and providing information on the location, species, number of animals injured or killed, and the Permit Number. Following the initial notification, the County-approved biologist shall prepare written documentation of the information reported by telephone. Permittee shall send CDFW a written report within two calendar days. The report will include the date, time and location of the finding or incident, location of the carcass, and if possible provide a photograph, and any other pertinent information. The CDFW contact information is 1416 9th Street, Sacramento, CA, 95814, and (916) 654-4262. The USFWS contact information is Ventura Fish and Wildlife Office, 2493 Portola Road, Suite B, Ventura, CA 93003.

17. Any other avian species (excluding protected avian species) found incidentally (outside surveys window or transects described in Section 6.2.1 below), will be identified, photographed, and documented in the same manner as the regular surveys. These incidental findings will be noted as incidental discoveries and will not be entered into the statistical calculation of mortality rate.

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18. PVS is required pursuant to the San Benito County's conditions of approval (Mitigation Measure BR16.2) to evaluate and implement feasible foundation installation systems to minimize noise and vibration that would affect wildlife including avian species (San Benito County 2010). Additional noise minimization measures will be implemented during the construction phase that will reduce potential impacts to nearby wildlife including avian species and livestock from loud noises as needed.

19. All spills of hazardous materials shall be cleaned up immediately in accordance with the Project's Spill Prevention Control Plan.

20. Pets are prohibited at the Project Footprint and Conservation Lands with the exception of working dogs. Working dogs that assist ranchers or those used for San Joaquin kit fox scat detection are not considered pets. Any working dog entering the Project Footprint will be required to provide proof of inoculations to prevent disease transmission.

21. Firearms are prohibited within the Project Footprint.

22. All food-related trash, such as wrappers, cans, bottles, bags, and food scraps shall be disposed of daily in containers with secure covers and regularly removed from the Project Footprint.

23. Use of rodenticides is prohibited within the Project Footprint.

24. Use of herbicides in areas impacted by the Project will be restricted to use within the prescriptions of the Noxious Weed and Invasive Plant Control Plan. Herbicides used for noxious weed control would be applied in accordance with BLM-approved procedures and other federal and state regulations. Applications will be applied by licensed applicators in accordance with label directions and other restrictions mandated by U.S. Environmental Protection Agency, County Agricultural Commissioner, regional label prescriptions on use, California Department of Food and Agriculture, and other state and federal legislation.

25. Appropriate measures shall be undertaken to prevent unauthorized off-road vehicle entry into sensitive habitat areas. Signage will be the preferred method to discourage use.

26. Project vehicles shall be confined to existing roads, construction roads, perimeter roadway for the Project Footprint, and transportation corridors between panels. Vehicle travel is not permitted off of designated transportation routes, except in the case of emergency or as approved by the designated biologist. A day-time speed limit of 15 miles per hour (mph) and a night-time speed limit of 10 mph will be adhered to on the Project Footprint, and Project personnel will not exceed 25 mph on public roads in the vicinity of the Project site.

27. Upon completion of any section of the Project, all areas that are significantly disturbed and not necessary for future operations, shall be stabilized to resist erosion, and revegetated and re-contoured if necessary, and will follow goals and methods in the Habitat Restoration and Revegetation Plan to promote restoration of the area to pre-Project conditions.

28. All carcasses of large animals (e.g. deer, pig, livestock, etc.) found within the Project Footprint or along Little Panoche Road adjacent to the Project Footprint and VFCL will be removed to an appropriate landfill within 24 hours to reduce the risk of vehicle collision on scavenging raptors and ravens.

5.2 Other Avian Specific Avoidance and Minimization Measures

To minimize impacts to nesting birds, this conservation strategy includes nesting bird deterrent methods within and adjacent to active construction areas, including substations and laydown yards and in or on construction-related equipment. PVS or their subcontractors may use all legally available measures to deter initiation of nest building on equipment and structures vital to project construction. Effective deterrent methods within work areas will reduce the likelihood of avian nests becoming established on Project construction-related materials, equipment, and buildings; thereby reducing potential for impacts to nesting birds due to Project construction. All nesting bird deterrent methods will be evaluated and implemented by PVS or its subcontractors.. These methods will be evaluated by the County-approved biologist to assure compliance with the applicable mitigation measures, permits, and regulations. Nesting bird deterrent methods may include but are not limited to the following:

- Removing vegetation (e.g. trees that could be used for nesting) from the active construction area;
- Installation and daily maintenance of appropriate-sized mesh netting or tarps on construction equipment and materials in material storage, equipment assembly and support, and contractor laydown yards, or other Project equipment or facilities;
- Using wire spikes placed on towers, substations, or other facilities to discourage birds from perching and nesting on these structures;
- Installing visual deterrents in active construction areas, yards, and substations, and on materials and equipment. Visual deterrents will not be used in raptor nests;
- Covering staged/stored potential nesting substrates (e.g. straw wattles) in active construction areas, yards, and substations;
- Wrapping, stuffing, or covering ends of pipes or other materials within which birds could nest;
- The use of colored gravel, such as red or white, in active construction areas, yards, and substations; and/or
- Managing construction yard trash in a manner that reduces potential point food sources in active construction areas, yards, and substations.

Specific locations for the use of exclusionary or deterrent devices will be determined in coordination with PVS' Environmental Manager and the County-approved biologist. PVS will request concurrence

from CDFW for any deterrents proposed that are not detailed in this section. All nesting deterrents below are intended to prevent nesting attempts and do not include the use of devices that prevent nesting from continuing once a nest is built.

The deterrent methods listed below, either on their own or in combination with other measures, can be effective in discouraging bird nesting within and immediately adjacent to construction areas. The effectiveness of deterrents will be evaluated for the duration of construction and adapted accordingly based on input from PVS' Environmental Manager and the County-approved biologist. PVS will submit a summary of the deterrents used and perceived effectiveness in the Monthly Compliance Report to the USFWS, CDFW and San Benito County during construction.

5.2.1 Vegetation Removal

Removing potential nesting habitat is the first component in effectively excluding nesting birds within the Project Footprint's construction area. To the extent feasible prior to the onset of the nesting bird season, construction areas will be cleared of vegetation (e.g. trees) to reduce potential conflicts between construction activities and nesting birds during the breeding season.

Vegetation removal both during and outside of breeding season, may include removal of trees, shrubs, and herbaceous species. Prior to vegetation clearance within the nesting bird season, the County-approved biologist or biological monitor under the direct supervision of the County-approved biologist will conduct a pre-construction survey for nesting birds.

5.2.2 Tarps

Where practical, equipment and materials can be covered with tarps; however, tarps must be tied down firmly to secure them against strong winds, and will not be open at the bottom because some species, Rock Wrens in particular, will access the equipment or material from the bottom. Tarps will be inspected at least once per week to identify and correct any openings that may allow cavity-nesting bird species to enter. If openings are found, the tarps will be inspected for trapped wildlife before re-closure.

5.2.3 Bird Spikes

Use of plastic or stainless steel spikes can be effective in discouraging birds from landing on structures and thus deterring nest establishment. Bird spikes typically consist of groupings of stainless steel or UV-resistant polycarbonate spikes that are spaced in such a way as to prevent birds from landing and gaining a foothold on the surface to which the spikes are adhered.

Bird spikes are designed to be affixed to structures to provide longer-term deterrents to birds. Therefore, use of bird spikes may be more practical to deter nesting on poles/structures and within substations. Such devices are not likely practical for use on equipment, material storage areas, or contractor yards.

5.2.4 Material and Pipe Covers

Sheltered spaces such as pipes or stacks of stored materials provide potential nesting sites for some birds. To reduce the likelihood that birds will build nests in these areas materials can be covered with mesh netting or tarps (discussed above) or pipe covers. Routinely covering equipment and stored materials is a standard management practice that can be effective in deterring birds from nesting in these areas.

Yards often contain suitable nesting materials or opportunities for birds. For example, straw waddles can be attractive to birds, as they provide excellent nesting material for a wide range of species. Birds attracted to this source of nest material may be more likely to build a nest in close proximity to these stored materials (e.g., within a yard). To reduce the likelihood for nesting in yards waddles and similar stored material will be covered.

5.2.1 Colored Gravel

Use of colored gravel in construction areas that would typically be rocked and maintained for a long term (e.g., in yards and substations) can be effective in discouraging ground nesting birds. The eggs of ground nesting birds are patterned in a manner to be camouflaged against naturally colored substrates such as soil or pebbles. By covering the ground surface with colored gravel that contrasts sharply with the color of the birds' eggs, ground-nesting birds can be effectively discouraged from nesting in such locations.

5.2.1 Mesh Netting

An option to tarps is to use mesh netting to cover equipment, stored materials and equipment, and partially constructed support facilities helps prevent birds from accessing potential nesting sites within the construction areas. Inspections and maintenance of netting will be performed daily to avoid impacts to birds and other wildlife species.

The size of the mesh grid can vary depending on the sizes of birds that are being excluded. Given the diversity of birds that could nest within construction areas across the Project Footprint, a 0.75-inch sized mesh may be suitable for excluding the greatest number of birds, including small birds such as House Finches.

To increase the effectiveness of the mesh netting as a bird exclusion device, equipment or other objects will be completely covered leaving no gaps in the netting through which birds could enter and build a nest under the netting. Mesh netting if used, will be inspected daily to identify and repair any rips or gaps in the netting that could permit birds to pass through, and to look for wildlife that may have become trapped in the netting. If wildlife are observed inside or trapped in the mesh netting, the Environmental Manager or County-approved biologist will be contacted immediately. The County-approved biologist or biological monitor will also inspect netting during monitoring to assure that birds or other wildlife have not become trapped under the netting. Care will be taken to avoid excessive netting on the ground to minimize potential for lizard and snakes to become entangled. Notification of all animal entrapment will be submitted in the Monthly Compliance Report to the USFWS, CDFW and San Benito County during construction.

6.0 CONSTRUCTION AND POST-CONSTRUCTION MONITORING (TIER 4)

Construction and post-construction monitoring will facilitate documentation of any impacts (e.g. fatalities, injury, and disturbance) that might occur and will identify factors associated with potential avian impacts, which might warrant additional avoidance and minimization measures or improvement or elimination of avoidance and minimization measures found to be ineffective. Implementation of the proposed monitoring program will provide information to the USFWS, CFWS, San Benito County and PVS to assist in the evaluation of the effectiveness of the avoidance and minimization measures. As part of the Project's monitoring and reporting program, post-construction monitoring and reporting will be completed to determine whether baseline evaluations of impacts on avian species, including Golden Eagles, are consistent with operational outcomes. All O&M workers will participate in WEEP training. This training will assist O&M workers with identifying nests and documenting avian interactions, including mortalities, within the PVS Project Footprint. Because not a significant amount of information pertaining to the methods for surveying PV solar facilities for avian mortalities is available, several documents were reviewed to assist in the development of this and other sections of this plan. The documents include *Centinela Solar Energy Project Bird and Bat Conservation Strategy* (2012) and *Genesis Solar Revised Bird and Bat Conservation Strategy* (2014)

6.1 Breeding Monitoring and Nesting Management

As noted above, PVS will conduct surveys for nesting and breeding birds and implementation of avoidance measures. Prior to any site disturbance (i.e., mobilization, staging, grading or construction) during the breeding season, PVS will retain a County-approved biologist to conduct pre-construction surveys for nesting birds. Surveys for nesting birds shall be conducted within the recognized breeding season in all areas within 500 feet of solar arrays, staging areas, substation sites, and access road locations within the Project Footprint and around the perimeter of the Project Footprint that falls within the 500 feet of the previously mentioned structures. The surveys will be completed with a frequency of every two weeks during the breeding season utilizing various methods such as point counts/transects as deemed necessary by the County-approved biologist. Surveys for raptors shall be conducted for all construction areas including a 500 feet buffer areas around the Project Footprint between February 1 and August 15 utilizing the frequency and methods as deemed necessary by the County-approved biologist. The required survey dates may be modified based on local conditions, as determined by the County-approved biologist, with the approval of the County of San Benito.

As stated above in the best management practices (BMPs) and avoidance and minimization measures (Section 5.1), if breeding birds (non-raptors) with active nests (incubating eggs or fledging young) are found prior to or during construction, a biological monitor, under the supervision of a County-approved biologist, shall establish a 300-foot buffer around the nest for ground-based construction activities and no activities will be allowed within the buffer(s) until the young have fledged from the nest or the nest fails. If raptors with active nests are found, a 500-foot buffer for raptors will be placed around the nest until the young have fledged the nest or the nest is deemed to have failed. If nesting Golden Eagles are identified, a 0.5-mile no activity buffer will be implemented.

As an exception to the above stated buffers, PVS will rely on the assessment of County-approved biologist(s) to determine the appropriate buffers for each nest. Appropriate buffers will be determined by the County-approved biologist(s) and the determination of buffer widths will be site- and species/guild specific and data-driven and not based on generalized assumptions, and will consider the following factors:

- Nesting chronologies
- Geographic/topographic location
- Existing ambient conditions (human activity within line of sight, such as traffic, construction, and noise)
- Type and extent of disturbance (e.g., noise levels and quality)
- Visibility of disturbance
- Duration and timing of disturbance
- Influence of other environmental factors
- Species' site-specific level of habituation to the disturbance, and
- Common and abundant species

As stated above, standard buffer widths recommended for the Project are 300 feet for non-raptor species and 500 feet for raptors. Any exception to the standard buffers will be determined on site by the County-approved biologist(s) and will be based on the factors listed above. The modified buffers are expected to avoid and minimize the potential for Project-related nest abandonment and failure of fledging, and minimize any disturbance to the nesting behavior. If the County-approved biologist determines that Project activities cause or contribute to a bird being flushed from a nest or other signs of disturbance of a nesting bird at a level that has potential to cause nest failure, the modified buffer will be re-evaluated and revised or increased if necessary. Due to common and abundant avian species and avian species that have become habituated to disturbance, these modified buffers can be considered "no-work/no-stop buffers". For example, a modified buffer could allow for only drive-through access with reduced speed. Once a nest buffer is established, the monitoring frequency and construction restrictions for each nest will depend on the bird's sensitivity to disturbance from the specific work activity.

The nesting buffers may be adjusted to reflect existing conditions including noise, topography, disturbance and etc. with the approval of the County-approved biologist. The biological monitor(s) shall conduct regular monitoring of the nest(s) (weekly at a minimum), but frequency will vary depending on the assessment of the County-approved biologist, to determine success/failure and to ensure that unapproved Project activities are not conducted within the buffer(s) until the nesting cycle is complete or the nest fails. The biological monitor(s) shall be responsible for documenting the

results of the surveys and ongoing monitoring and will provide a copy of the monitoring reports for impact areas to the respective agencies.

Surveys shall be conducted to include all structural components of the solar arrays and related structures as well as all construction equipment. If birds are found to be nesting in facility structures, buffers as described above shall be implemented. If birds are found to be nesting (incubating eggs or fledging young) in construction equipment, it is possible that the equipment may not be used until the young have fledged the nest, the nest is deemed as failed, no young are present, or until after the breeding season has passed. However, if deemed necessary by the County-approved biologist, an active bird nest can be removed from construction equipment as long as the species is a non-raptor or special status species active nest and concurrence from the USFWS and/or CDFW is received.

If for any reason an active bird nest (incubating eggs or fledging young) must be removed during the nesting season, the PVS shall provide written documentation providing concurrence from the USFWS and/or CDFW authorizing the nest removal and/or relocation. Additionally PVS shall provide a written report documenting the removal efforts. The report shall include what actions were taken to avoid removing the nest, the location of the nest if relocation is possible, what species is being removed/relocated.

If trees or existing poles/towers are to be removed as part of Project-related construction activities they will be done so outside of the nesting season to avoid additional impacts to nesting raptors. If removal during the nesting season can't be avoided then trees and existing poles/towers, a biological monitor must confirm that the trees, poles or existing nests are vacant prior to its removal. If nests are found within these structures and contain eggs or young the biological monitor shall allow no activities within a 300-foot buffer for nesting birds and/or a 500-foot buffer for raptors until the young have fledged the nest with exception of modified buffers as described above.

6.2 Mortality Monitoring

The post-construction mortality monitoring is being completed to assist the County in determining that avian bird mortality caused by solar facilities will not be substantial and will not have any potentially adverse impacts on special-status bird populations and that additional avoidance, minimization or mitigation is not necessary. The post-construction mortality monitoring will be comprised of two different types of monitoring. The first is the mortality monitoring which consists of regular, systematic searches of sample blocks of PV solar panels that will be used to estimate mortality and injury rates for avian species within the Project Footprint during the initial three years of operation. The second monitoring involves the searches of the perimeter fence and power support structures (e.g. switchyard) by O&M personnel who have received specialized training. The data gathered during this monitoring will not be used to generate estimates of mortality rates. The post-construction mortality monitoring is anticipated to begin at the start of the first full seasonal interval after the Project is considered fully operational (i.e., sending power to the electrical grid) and this plan has been approved by the appropriate local, state and federal agencies. The post-construction monitoring programs will be completed for a minimum of three years after the Project is considered fully operational (USFWS 2010). Mortality monitoring will not be permitted during construction due to safety and access issues.

6.2.1 Mortality Monitoring

This section of the plan describes the procedures for the standard mortality monitoring for avian species on the Project Footprint during post-construction monitoring. The monitoring consists of avian carcass searches conducted at sample blocks of PV solar panels. The number of avian mortalities observed during the monitoring searches would provide a minimum number of fatalities at a project. This is due to the fact that not all avian mortalities that could occur on the Project Footprint would be found during the monitoring. The use of searcher efficiency trials and carcass persistence trials, described below, would assist in the bias attributable to carcass removal by scavengers and searcher efficiency. The annual mortality rates will then be estimated using statistical methods that adjust the number of avian carcasses found for these bias trials. The annual mortality rates will be calculated for all bird species combined, small (≤ 10 inches) and large (>10 inches) birds, raptors, and special-status avian species regulated by the CDFW and USFWS. The regulated species listed are listed in Table 1 and also includes other special-status bird species that may be incidentally encountered within the Project Footprint. In some cases, the sample size for a species group of interest, such as eagles or other sensitive species, may be too small to allow for the calculation of accurate mortality estimates (see Fatality Rate Estimation below). In those circumstances, the total avian mortalities fatalities detected during the standard and O&M searches will be total of individual observed which would be substituted in place of rate estimates (see Fatality Rate Estimation below).

The methods below are from wind energy projects (USFWS 2012), because not a significant amount of information pertaining to the causes or patterns of avian mortalities associated with solar PV projects is available. Due to the adaptive nature of this plan, the methodology of the monitoring may be changed to increase the effectiveness and efficiency of the monitoring (e.g., search interval, number of PV rows searched, plot size, analytical method).

Sampling Intensity and Duration

The post-construction mortality monitoring will consist of surveys of 20 percent of the approximately 1,629 acres of the Project Footprint acreage that will be developed with PV solar and will be conducted for three years after the Project is considered fully operational. After the second year of monitoring, PVS in consultation with the USFWS and CDFW will evaluate the results and determine whether additional years of monitoring are necessary. To avoid bias in the mortality estimate, the survey areas will be divided equally between the two portions of the Project divided by Little Panoche Road (Figure 2, Appendix A). The areas to be surveyed will be determined by the County-approved biologist six months prior to the estimated fully operational date. All monitoring surveys will be performed by two or more searchers driving transects at no more than five miles per hour on all-terrain vehicles or on foot. If deemed necessary by the County-approved biologist, a closed roof vehicle can be used for safety reasons.

Because the area beneath the PV solar panels will be mostly level and clear of any tall vegetation, the monitoring surveys will consist of searching the space between every other row of panels, and visually scanning the space to the next transect which is approximately 100 feet (30 meters) on each side of the transect within the survey areas. If tall vegetation is present within the survey boundaries, the vegetation will have to be managed to ensure that no potential carcasses would be

obscured. Extra attention will be given to the area immediately around the foundations of the solar panel structures, which are the only structures on the ground that might obscure a carcass from view. The same transects will be surveyed in all years of the monitoring period to avoid confounding effects from location in the solar field with variation among years.

The survey year will be divided into four seasons to allow for the inclusion of seasonal searcher efficiency probabilities and carcass persistence times. Post-construction mortality monitoring will occur over a 7-day period each month during the first year of operation. Initially, all transects will be sampled for seven consecutive days at the beginning of each month for 24 months (Strickland et al. 2011). The search interval may be adjusted to reduce bias, if needed, based on searcher efficiency and carcass persistence after the first full year of searches.

Seasons will be defined as follows for sampling:

- Spring: March 1 to May 31
- Summer: June 1 to August 15
- Fall: August 16 to November 15
- Winter: November 16 to February 28

Mortality Documentation

During the initial preparation for each round of carcass surveys, a preparatory survey will be conducted to remove any avian carcasses that have occurred before each round of the surveys is initiated. The mortality surveys will be used to determine the overall estimated mortality rate for birds for the Project. These rates serve as the basis for all comparisons of fatalities, indicators of relationships with site characteristics and environmental variables, and evaluation of mitigation measures implemented at the time of project construction (Strickland et al. 2011). Any carcasses found will be documented and removed in the same manner as those found during the regular carcasses searches. These carcasses will not be included in the statistical analysis because the protocol requires a known search interval.

Surveyors will assume that avian carcasses found within the survey areas are due to the solar facility unless the cause of death can be clearly attributed to a non-facility cause. Avian carcasses found during the carcass surveys will be marked with a unique number, and species, sex, and age if possible will be documented. In addition, the date, time found, Global Positioning System (GPS) location coordinates, condition (e.g., intact, scavenged, feather spot), surveyor, and any comments pertaining cause of death or other pertinent information will be collected. All of the carcasses found whether during the preparatory or regular surveys will be photographed in place. Once the carcasses are documented, with the exception of eagles, state and federal listed species, and/or fully protected species (e.g., California condor, white-tailed kite) which will be left where found and agencies notified, will be collected and placed in a dedicated freezer for the surveys.

Any carcasses found incidentally (outside surveys window or transects), will be identified, photographed, and documented in the same manner as the regular surveys. These incidental

findings will be noted as incidental discoveries and will not be entered into the statistical calculation of mortality rate.

Carcass Persistence Trials

Carcass persistence time estimates the amount of time an avian carcass will remain before it disappears due to scavenging or other means (e.g., wind and surface water or decomposition). Carcass persistence trials will be conducted in each season to evaluate seasonal differences in carcass persistence and possible differences in the size of the species being scavenged.

Carcasses to be utilized during the persistence trials will be selected to best represent the size of a range of avian species. If sufficient carcasses have been collected as fatalities at the Project, and are sufficiently fresh, they will be used for these trials. If additional carcasses are needed, commercially available carcasses will be substituted. For large birds, carcasses may include domestic waterfowl, pheasant, or similar species legally obtained from game farms. For small birds, carcasses may include European starlings, house sparrows, or other non-native species not legally protected. Assuming adequate carcass availability, one carcass persistence trial will be conducted during each of the seasons with a goal of at least 15 carcasses of each bird size class (15 large birds and 15 small bird) placed per season.

Estimates of the probability that a carcass persisted between search intervals and therefore was available to be found by searchers, will be used to adjust carcass counts for bias using methods presented in *An Estimator of Wildlife Fatality from Observed Carcasses* (Huso 2011) or equivalent analysis method.

Surveyor Efficiency Trials

The ability of surveyors to find carcasses is influenced by a number of factors (e.g. skill of an individual surveyor, vegetation composition and carcass characteristics). The objective of surveyor efficiency trials is to estimate the percentage of mortalities that the surveyors will be able to locate. Estimates of searcher efficiency are then used to adjust carcass counts for detection bias. Surveyor efficiency trials will be conducted in all seasons to account for seasonal differences in surveyor efficiency. The carcass species used in the trials and marking and placement techniques will be the same as those in the carcass persistence trials.

Surveyor efficiency trials will begin when carcass searches start. The surveyors conducting the searches will not know when trials are being conducted or the location of the efficiency trial carcasses. Trials will be conducted multiple times throughout each season and will incorporate testing of each member of the field crew. The surveyor will not know in advance when or where they are being tested. Assuming adequate carcass availability, a goal of at least 15 carcasses of each size class (15 large birds and 15 small birds) will be placed per season for surveyor efficiency trials.

Mortality Rate Estimation

To calculate the Project's estimated mortality rate (mortalities/megawatt/year) and the total Project fatalities, PVS will utilize the same methods as noted in the carcass persistence trials. The mortality

rate will be calculated for large birds, small birds, raptors (including eagles), and special-status species if at least 10 fatalities within the subgroups are found.

The estimation of mortality rates will incorporate fatalities documented during the carcass searches adjusted for bias. Specifically, estimates will take into account:

- Search interval;
- Observed number of carcasses found during searches during the monitoring year for which operation of the facility cannot be ruled out as the cause of death;
- Carcass persistence, expressed as the probability that a carcass is expected to remain in the study area (persist) and be available for detection by the searchers during carcass persistence trials; and
- Surveyor efficiency, expressed as the probability of trial carcasses found by surveyors during searcher efficiency trials.

6.2.1 Operation and Maintenance Monitoring

Operation and maintenance monitoring will consist of searches of areas such as the substation, switchyard, area around the O&M building and the perimeter fence by operations personnel trained in finding and reporting avian mortalities.

Because of this low probability of collisions to these structures, they will be surveyed once each month (search interval of 30 days). Searches will be conducted by operations personnel trained in avian identification and survey techniques. Each survey will consist of the surveyor driving the perimeter fence at approximately five miles per hour on an all-terrain vehicle or other open vehicle or on foot. No surveys will be conducted where it is determined to be unsafe to operations personnel. The surveyors will record observations on the designated reporting form. Any carcasses found that are located in equipment or otherwise deemed to be a safety hazard will be removed ensure safe operation of the facility.

7.0 REPORTING

7.1 Construction

During the construction of the solar facility, the County approved biologist will submit a report describing dates, durations, and results of monitoring and data collection in the Monthly Compliance Report to the USFWS, CDFW and San Benito County. The Monthly Compliance Report which describes all natural resources information for the construction of the solar facility will also provide a detailed description of any Project related avian mortalities or injuries detected.

7.2 Post-Construction

The County approved biologist will prepare and submit quarterly reports to the USFWS, CDFW, and San Benito County during the first two years of operations. Quarterly monitoring reports will provide the dates, duration, and results of monitoring, including a detailed description of any

Project-related avian mortalities or injuries detected during the monitoring study or at any other time, and describe adaptive management measures implemented to avoid or minimize deaths or injuries. Original data sheets, photographs, and relevant shape files (if any) will be attached to the reports.

Following the completion of the fourth quarter of each year of monitoring, the Environmental Manager or County approved biologist will prepare an annual report that summarizes the year's data, analyzes any Project-related avian mortalities or injuries detected, and provides recommendations for future monitoring and any adaptive management actions needed. The report will be submitted to the USFWS, CDFW, and San Benito County no later than January 31st of the third year.

After two years of data collection, the Environmental Manager or County approved biologist will prepare an overall report that describes the study design and results of the avian mortality monitoring. This second year report will serve as the last quarterly report for the second year of monitoring, as well as the overall report that covers both years of monitoring. This report will be used to determine whether the monitoring design needs to be changed or if monitoring can be terminated through consultation with USFWS, CDFW, and the County. The report will be submitted to the USFWS, CDFW, and San Benito County no later than the first quarter of the third year of monitoring after the Project is fully operational.

8.0 ADAPTIVE MANAGEMENT (TIER 5)

The purpose of adaptive management in the context of the Project's management and monitoring of avian resources is to provide ways to further improve protection, management, enhancement, and other conservation actions of avian resources on the Project Footprint.

8.1 Regulatory Policy Changes

PVS will work together with the USFWS, CDFW, and San Benito County to ensure the Project complies with all applicable legal requirements or to apply necessary policy changes to this plan.

8.2 Post-Construction Agency Consultation

To facilitate evaluations of impacts on regional avian populations, study results will be provided to USFWS, CDFW and/or San Benito County as noted above. PVS will be available for annual meetings with USFWS, CDFW and/or San Benito County to discuss Project-related issues under the jurisdiction of each agency.

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APPENDICES

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Appendix A
Figures

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Appendix B

Avian Species Observed During 2003-2011 Audubon Christmas Bird Counts

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Avian Species Observed During the 2003 through 2011 Audubon Society Christmas Bird Count

Mallard *Anas platyrhynchos*	Long-eared Owl *Asio otus*	Northern Mockingbird *Mimus polyglottos*
American Green-winged Teal *Anas crecca*	Short-eared Owl *Asio flammeus*	Sage Thrasher *Oreoscoptes montanus*
Canvasback *Aythya valisineria*	White-throated Swift *Aeronautes saxatalis*	California Thrasher *Toxostoma redivivum*
Ring-necked Duck *Aythya collaris*	Anna's Hummingbird *Calypte anna*	European Starling *Sturnus vulgaris*
Common Goldeneye *Bucephala clangula*	Lewis's Woodpecker *Melanerpes lewis*	American Pipit *Anthus rubescens*
Hooded Merganser *Lophodytes cucullatus*	Acorn Woodpecker *Melanerpes formicivorus*	Cedar Waxwing *Bombycilla cedrorum*
Common Merganser *Mergus merganser*	Red-breasted Sapsucker *Sphyrapicus ruber*	Phainopepla *Phainopepla nitens*
Red-breasted Merganser *Mergus serrator*	Nuttall's Woodpecker *Picoides nuttallii*	Orange-crowned Warbler *Oreothlypis celata*
Chukar *Alectoris chukar*	Downy Woodpecker *Picoides pubescens*	Yellow-rumped Warbler *Dendroica coronata*
Ring-necked Pheasant *Phasianus colchicus*	Hairy Woodpecker *Picoides villosus*	Yellow-rumped (Audubon's) Warbler *Dendroica coronata*
California Quail *Callipepla californica*	Northern Flicker *Colaptes auratus*	Yellow-rumped (Myrtle) Warbler *Dendroica coronata*
Pied-billed Grebe *Podilymbus podiceps*	Northern (Red-shafted) Flicker *Colaptes auratus*	Townsend's Warbler *Dendroica townsendi*
Great Blue Heron (Blue form) *Ardea herodias*	Black Phoebe *Sayornis nigricans*	Spotted Towhee *Pipilo maculatus*
Great Egret *Ardea alba*	Say's Phoebe *Sayornis saya*	California Towhee *Melozone crissalis*
Turkey Vulture *Cathartes aura*	Cassin's Kingbird *Tyrannus vociferans*	Rufous-crowned Sparrow *Aimophila ruficeps*
Bald Eagle *Haliaeetus leucocephalus*	Loggerhead Shrike *Lanius ludovicianus*	Chipping Sparrow *Spizella passerina*
Northern Harrier *Circus cyaneus*	Hutton's Vireo *Vireo huttoni*	Vesper Sparrow *Pooecetes gramineus*
Sharp-shinned Hawk *Accipiter striatus*	Western Scrub-Jay *Aphelocoma californica*	Lark Sparrow *Chondestes grammacus*
Cooper's Hawk *Accipiter cooperii*	Clark's Nutcracker *Nucifraga columbiana*	Sage Sparrow *Amphispiza belli*

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Red-shouldered Hawk *Buteo lineatus*	Yellow-billed Magpie *Pica nuttalli*	Lark Bunting *Calamospiza melanocorys*
Red-tailed Hawk *Buteo jamaicensis*	American Crow *Corvus brachyrhynchos*	Savannah Sparrow *Passerculus sandwichensis*
Ferruginous Hawk *Buteo regalis*	Common Raven *Corvus corax*	Fox Sparrow *Passerella iliaca*
Golden Eagle *Aquila chrysaetos*	Horned Lark *Eremophila alpestris*	Song Sparrow *Melospiza melodia*
American Kestrel *Falco sparverius*	Tree Swallow *Tachycineta bicolor*	Lincoln's Sparrow *Melospiza lincolnii*
Merlin *Falco columbarius*	Violet-green Swallow *Tachycineta thalassina*	Harris's Sparrow *Zonotrichia querula*
Prairie Falcon *Falco mexicanus*	Chestnut-backed Chickadee *Poecile rufescens*	White-crowned Sparrow *Zonotrichia leucophrys*
Virginia Rail *Rallus limicola*	Oak Titmouse *Baeolophus inornatus*	Golden-crowned Sparrow *Zonotrichia atricapilla*
Sora *Porzana carolina*	Bushtit *Psaltriparus minimus*	Dark-eyed (Oregon) Junco *Junco hyemalis*
American Coot *Fulica americana*	Red-breasted Nuthatch *Sitta canadensis*	Red-winged Blackbird *Agelaius phoeniceus*
Killdeer *Charadrius vociferus*	White-breasted Nuthatch *Sitta carolinensis*	Tricolored Blackbird *Agelaius tricolor*
Mountain Plover *Charadrius montanus*	Brown Creeper *Certhia americana*	Western Meadowlark *Sturnella neglecta*
Greater Yellowlegs *Tringa melanoleuca*	Rock Wren *Salpinctes obsoletus*	Brewer's Blackbird *Euphagus cyanocephalus*
Long-billed Curlew *Numenius americanus*	Canyon Wren *Catherpes mexicanus*	Brown-headed Cowbird *Molothrus ater*
Wilson's Snipe *Gallinago delicata*	Bewick's Wren *Thryomanes bewickii*	small blackbird sp. *Icterinae*
Rock Pigeon *Columba livia*	House Wren *Troglodytes aedon*	Purple Finch *Carpodacus purpureus*
Eurasian Collared-Dove *Streptopelia decaocto*	Marsh Wren *Cistothorus palustris*	House Finch *Carpodacus mexicanus*
Mourning Dove *Zenaida macroura*	Ruby-crowned Kinglet *Regulus calendula*	Pine Siskin *Spinus pinus*
Greater Roadrunner *Geococcyx californianus*	Western Bluebird *Sialia mexicana*	Lesser Goldfinch *Spinus psaltria*
Barn Owl *Tyto alba*	Mountain Bluebird *Sialia currucoides*	Lawrence's Goldfinch *Spinus lawrencei*
Western Screech-Owl *Megascops kennicottii*	Hermit Thrush *Catharus guttatus*	American Goldfinch *Spinus tristis*

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Great Horned Owl *Bubo virginianus*	American Robin *Turdus migratorius*	House Sparrow *Passer domesticus*
Northern Pygmy-Owl *Glaucidium gnoma*	Varied Thrush *Ixoreus naevius*	
Burrowing Owl *Athene cunicularia*	Wrentit *Chamaea fasciata*	

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