DOCKET	
09-AFC-9	
DATE	FEB 23 2010
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February 23, 2010

Eric Solorio
Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

RE: Ridgecrest Solar Power Project (RSPP), Docket No. 09-AFC-9, Habitat Monitoring and Mitigation Plan (HMP)

Dear Mr. Solorio:

As requested, attached please find Ridgecrest Solar I, LLC's Habitat Monitoring and Mitigation Plan (HMP) for the Ridgecrest Solar Power Project.

If you have any questions on this plan, please feel free to contact me at 510-809-4662 (office) or 949-433-4049 (cell).

Sincerely,

Billy Owens
Director, Project Development

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BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
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APPLICATION FOR CERTIFICATION
For the *RIDGECREST SOLAR POWER PROJECT*

Docket No. 09-AFC-9

PROOF OF SERVICE
(Revised 2/23/2010)

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DECLARATION OF SERVICE

I, Elizabeth Copley, declare that on February 23, 2010, I served and filed copies of the attached Ridgecrest Solar Power Project (Docket No. 09-AFC-9) Habitat Monitoring and Mitigation Plan (HMP). The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:

[http://www.energy.ca.gov/sitingcases/solar_millennium_ridgecrest].

The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

For service to all other parties:

_X_ sent electronically to all email addresses on the Proof of Service list;

__ by personal delivery or by overnight delivery service or depositing in the United States mail at Oakland, California with postage or fees thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

For filing with the Energy Commission:

X sending an original paper copy and one electronic copy, mailed and emailed Respectively, to the address below (preferred method);

OR

__ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 09-AFC-9
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
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I declare under penalty of perjury that the foregoing is true and correct.

PRELIMINARY
HABITAT MITIGATION AND MONITORING PLAN

RIDGECREST SOLAR POWER PROJECT
RIVERSIDE COUNTY, CALIFORNIA

Prepared for:

Ridgecrest Solar I, LLC
1625 Shattuck Avenue, Suite 270
Berkeley, California 94709

Prepared by:

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February 24, 2010

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LIST OF ACRONYMS

AFC	Application for Certification
BLM	U.S. Bureau of Land Management
BMP	Best Management Practice
BRSA	Biological Resources Survey Area
BRTR	Biological Resources Technical Report
Cal-IPC	California Invasive Plant Council
CBOC	California Burrowing Owl Consortium
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CESA	California Endangered Species Act
CRAM	California Rapid Assessment Method
DRECP	*Desert Renewable Energy Conservation Plan*
DT	Desert Tortoise
DWMA	Desert Wildlife Management Area
FESA	Federal Endangered Species Act
HCA	Habitat Conservation Area
HMP	Habitat Mitigation and Monitoring Plan
HTF	Heat Transfer Fluid
kV	kilovolt(s)
MGS	Mohave ground squirrel
MSL	mean sea level
NGO	Nongovernmental Organization
OHV	Off-highway Vehicle
PAR	Property Analysis Record
ROW	right-of-way
RSPP	Ridgecrest Solar Power Project
SCE	Southern California Edison
SSC	Species of Special Concern
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WBO	Western Burrowing Owl
WEMO	West Mojave Plan
°F	degrees Fahrenheit

1.0 INTRODUCTION

This Preliminary Habitat Mitigation and Monitoring Plan (HMP) has been developed for the proposed Ridgecrest Solar Power Project (RSPP) located in Kern County, California (Figure 1). Compensatory mitigation for Project impacts to protected resources will be tailored to benefit sensitive species and habitat occurring in the region and will take place through a combination of 1) offsite habitat acquisition, 2) funding of habitat enhancement programs, and 3) design and implementation of studies that may inform land management and conservation strategies.

1.1 Organization of the Document

The plan includes a description of the Project's effects on biological resources at the Project site and outlines the offsite mitigation strategies proposed to compensate for these effects. Purely onsite mitigation measures at the Project site (i.e., preconstruction surveys), funding of habitat enhancement programs, and development of additional resource studies are not addressed in this HMP. Biological resources addressed herein include State waters falling under the purview of the California Department of Fish and Game (CDFG), western burrowing owl (WBO), Mojave desert tortoise (DT), and Mohave ground squirrel (MGS). Specific offsite mitigation lands have not been secured at this time; therefore, potential land enhancements, management guidelines, monitoring, and reporting strategies are outlined in this document. Existing conditions are reflective of the data collected for the November Project design as reported in the supplemental Biological Resources Technical Report (BRTR) (AECOM 2009c). However, the Project has been reconfigured to minimize overall direct impacts, primarily avoidance of impacts to the El Paso wash and associated special-status species habitat, and facilitate protection of a potential MGS movement corridor. The Project description and Figures 1 through 7 in this HMP have been updated to reflect the boundary of the current Project redesign as discussed in the January 25, 2010, California Energy Commission (CEC) Data Request Responses. DT and MGS habitat calculations have been updated for the redesigned Project area based on recent site assessments. This HMP is considered preliminary and will be updated with mitigation site-specific data and conceptual enhancement plans when this information becomes available and agency consensus is obtained.

1.2 Responsible Parties

The Applicant/Permittee for the RSPP is:

Ridgecrest Solar I, LLC
1625 Shattuck Avenue, Suite 270
Berkeley, California 94709

1.3 Regulatory Agency Context and Coordination

An Application for Certification (AFC) was filed with the CEC in September 2009. Compensatory mitigation requirements for impacts to sensitive biological resources are being determined in consultation with CDFG and the U.S. Fish and Wildlife Service (USFWS) as part of the CEC project certification as well as Federal and State Endangered Species Act (FESA, CESA) consultation processes. Several required permit applications have been or are being submitted (i.e., CDFG Streambed Alteration Agreement). Sensitive biological resources on the Project site addressed in this plan fall under the following agency regulations or policies:

- Desert wash – CDFG Code Sections 1600–1616 regulate activities that would alter the flow, bed, channel, or banks of aquatic features where there is an existing wildlife benefit;
- WBO – a California Species of Special Concern (SSC), individuals and nests protected under the Migratory Bird Treaty Act and CDFG Code;
- DT – listed as threatened under the FESA and CESA; and
- MGS – listed as threatened under the CESA.

Various plans developed to better manage desert habitats in the region (Northern and Eastern Colorado Coordinated Management Plan, USFWS DT Recovery Plan (1994b), West Mojave Plan [WEMO; BLM 2005]), species habitat requirements, and mitigation requirements for similar projects were utilized as guidelines in development of this plan.

2.0 PROJECT REQUIRING MITIGATION

Numerous biological surveys and habitat assessments have been conducted on the RSPP site during 2009 to document vegetation communities and aquatic features, and evaluate the presence/absence of sensitive species. A summary of biological survey findings for the Biological Resources Survey Area (BRSA), the proposed Project, and Project effects on sensitive biological resources is provided in this section.

2.1 Project Location

The RSPP would be located in the high northern Mojave Desert in northeastern Kern County, California, approximately 5 miles southwest of the City of Ridgecrest, approximately 6 miles southeast of the town of Inyokern, and less than 1 mile southwest of U.S. Highway 395 (Figure 1). The Project would be located within a 3,995-acre right-of-way (ROW) owned by the Federal government and leased by the Applicant from the Bureau of Land Management (BLM). The Project also includes a water pipeline proposed to be installed within existing county road ROWs along China Lake Boulevard and Brown Road south and west of Ridgecrest. The Project facilities would occupy approximately 1,448 acres of the 3,995-acre site, and there would be a total Project disturbance area (area inside and outside the facility fence line that will be disturbed by the Project), of approximately 1,944 acres on site plus 16.3 acres resulting from construction of the water pipeline off site.

2.2 Project Summary and Key Elements

To reduce impacts on sensitive biological resources, the Project site plan was reconfigured to minimize impacts to the El Paso Wash, increase connectivity for MGS, and to reduce the impact to DT. The Project description, including acreage calculations, presented below are based on the reconfigured site plan. The redesigned Project impact area is located within the 1-mile buffer previously surveyed and therefore allows the application of existing data for some assessment of habitat impacts within the new Project boundary with the exception of jurisdictional waters, which were only delineated within the Project disturbance areas. An updated jurisdictional determination will be conducted in spring 2010, and the HMP impact calculations will be revised accordingly.

The proposed Project site is entirely on Federal land, including BLM ROW # CACA 49016, in Township 28 South, Range 39 East. Access to the northern portion of the Project site would be provided by a new 24-foot-wide paved access road from Brown Road, approximately 1.6 miles west of the intersection of Brown Road with U.S. Highway 395. This access road runs about 450 feet from Brown Road to the location of the new office building and continues for approximately another 3,000 feet to the entrance of the power block. Access to the southern portion of the Project site would also be provided by a new 24-foot-wide paved access road from Brown Road, approximately 2.25 miles west of the intersection of Brown Road with U.S. Highway 395. This access road would run about 600 feet from Brown Road to the security gate for the south solar field.

The Applicant has applied for a ROW grant for approximately 3,995 acres of land owned by the Federal government and managed by BLM. The Project site is composed of undeveloped desert with naturally vegetated areas. There are no existing structures on site that would need to be demolished, but existing 115- and 230-kilovolt (kV) Southern California Edison (SCE) transmission lines that traverse the southwestern portion of the site will require relocation. Construction and operation of the RSPP would disturb approximately 1,944 acres on site plus 16.3 acres off site resulting from construction of the water pipeline. This total includes areas outside the fence line of the Project facilities themselves, primarily rerouted drainage channels that avoid Project facilities, a water line, and access roads.

The Applicant proposes to develop a 250-megawatt solar energy facility on approximately 1,448 acres. The Project will utilize solar parabolic trough technology to generate electricity. Arrays of parabolic mirrors collect heat energy from the sun and refocus the radiation on a receiver tube located at the focal point of the parabola. Heat transfer fluid (HTF) is heated to high temperatures (750 degrees Fahrenheit [°F]) as it circulates through the receiver tubes. The heated HTF is then piped through a series of heat exchangers where it releases its stored heat to generate high-pressure steam. The steam is then fed to a traditional steam turbine generator where electricity is produced.

The power plant will have two solar fields. The north solar field would be 1,118 acres and the south field would be 809 acres. The northern solar field would be located north of Brown Road and the southern solar field would be located south of Brown Road.

The power block would be located north of Brown Road, immediately southwest of the northern solar field. The power block would be composed of its own administration, control, warehouse, maintenance, and lab buildings; the HTF pumping and freeze protection system; solar steam generator; a propane-fired auxiliary boiler; one steam turbine generator; an air-cooled condenser; generator step-up transformer, transmission lines, and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system).

In addition to the main power-generating facility, the site would include a main office building and parking lot, a main warehouse with laydown area, onsite access roads, a tie-in switchyard, and a land treatment unit for bioremediation or land farming of any HTF-contaminated soil.

The Project would generate electric power solely via solar energy. Propane would be used to fire an auxiliary boiler overnight to support startup operations until the HTF system was up to operating temperature, at which time the generation of electricity could commence. A second fired heater would be used as needed, mostly during the winter, to prevent freezing of the HTF. A new, approximately 5-mile-long water pipeline would be installed within the Brown Road and China Lake Boulevard ROWs to connect the Project with the Indian Wells Valley Water District supply. (The diameter of the pipe would be 16 inches or smaller depending on the Water District's determination.) A new 230- kV transmission line from the turbine generator to a new nearby switchyard would interconnect with SCE's existing 230-kV InyoKern/Kramer Junction transmission line located west of the Project site.

2.3 Project Site Characteristics

The following summarizes the Project site characteristics from the AFC prepared by AECOM (2009a) for the RSPP, except where otherwise noted.

The RSPP site is located on an alluvial fan that slopes northward from the El Paso Mountains to the southwest; it consists primarily of undeveloped open space. Historic and current uses of the site (both approved and unapproved) include grazing allotments, off-road vehicle use, target practice, and trash dumping. For a full description of the characteristics, refer to the individual documents noted for each characteristic.

2.3.1 Climate

The climate in the Basin and Range province is characterized as dry and arid and characterized by low precipitation. The region experiences a wide variation in temperature, with very hot summer months with mean maximum temperatures exceeding 100°F occurring in July and August and cold dry winters with mean maximum temperatures in the 60s °F and lows in the 30s °F occurring in December.

2.3.2 Topography

Topography at the site is relatively flat and slopes gently downward in a northwest direction at a gradient of approximately 0.2 percent. Ground surface elevations range from approximately 2,890 feet above

Mean Sea Level (MSL) in the southeast to 2,580 feet above MSL in the northwest. A steeper grade of 8 percent is present along the eastern side of the Project at the rock outcrops.

2.3.3 Soils

The California Soil Resources Lab mapped two soil complexes occurring within the disturbance area (U.C. Davis 2009):

1. Cajon-Wasco-Rosamond, and
2. Trigger-Sparkhule-Rock Outcrop.

The two soil complexes are generally mapped having a shared boundary. The Cajon-Wasco-Rosamond complex occupies most of the disturbance area, which is associated with a large, alluvial fan. The Trigger-Sparkhule-Rock Outcrop complex is located only in the southwestern portion of the disturbance area, in association with the taller rock outcroppings (AECOM 2009b). Between these two complexes, eight soil series are listed as hydric on the National Hydric Soils List (NRCS 2009).

Six of the eight hydric soils are within the entisol soil order. The other two hydric soils are within the aridisol soil order. Although not mapped in detail, the eight listed hydric soils are typically associated with drainage features and are as follows: Arizo, Cajon, Manet, Rosamond, Rositas, Sunrise, Tray, and Wasco (AECOM 2009b).

Site soils were described during a reconnaissance-level geotechnical assessment conducted for the site. General observations indicated that soil textures at the site ranged from coarse sands to sandy clay loams, but were predominantly sandy loams. This was confirmed by the laboratory textural analysis conducted for soil samples collected at the site.

2.3.4 Surface Water Hydrology

The disturbance area occurs within the 2,020-square-mile Indian Wells-Searles Valleys Watershed (HUC: 18090205) and is located within the Regional Water Quality Control Board Region 6, South Lahontan Hydrologic Basin Planning Area, Indian Wells Hydrologic Unit (624.00), China Lake Hydrologic Area (624.20). The rainfall pattern is bimodal with a rainy season in both summer and winter (December through March and July through September [the commonly wetter of the two]) (AECOM 2009b). Average annual rainfall for the disturbance area (China Lake Hydrologic Area) is approximately 3.7 inches (NOAA 2009).

Surface hydrology of the disturbance area is influenced by the surrounding mountain ranges during storm events. The disturbance area is located on the southern edge of the Indian Wells Valley and north of the El Paso Mountains. The general stormwater flow pattern is from the higher elevations in the mountains located approximately 6 miles south to the lower elevations in Indian Wells Valley to the north. The stormwater from the disturbance area flows northeast and eventually to China Lake, which is a depression in the Indian Wells Valley with no identifiable outlet. Storm flows generated by the existing site itself generally sheet to washes in the northeast and northwest. Offsite hydrology drains a combined set of distinct watersheds totaling approximately 37 square miles, which generally drains from local topographic highs located south of the disturbance area northward to relatively more gradually sloped areas at the southern and northern solar fields (AECOM 2009b).

Although there are several large swales that drain the disturbance area, the major watercourse in the RSPP is El Paso Wash, which is an ephemeral wash that drains approximately 22 square miles from the El Paso Mountains and exits the mountains to the south of the site. El Paso Wash runs approximately through the center of the disturbance area. This wash drains water from the south hills and crosses Brown Road inside the property boundary. Currently, El Paso Wash flows over Brown Road at a low point in the road and continues sloping in a northwest direction along the RSPP. Drained water crosses U.S. Highway 395 at several points in both east-west and west-east directions, hydraulically connecting all the catchments in this drainage area. The railroad grade interrupts several natural drainage paths

concentrating flows to several water courses that cross the railroad grade through pipes, concrete culverts, and timber bridges, which have altered existing flow patterns in the disturbance area drainage area and water crossings beneath U.S. Highway 395 (AECOM 2009b).

As they flow eastward from the base of the El Paso Mountains, the ephemeral channels generally convert from sparsely vegetated slightly meandering to an anastomosed morphology, presented as semibraided beds with regular incised compound channels and multiple relic channels (AECOM 2009b). These channels are highly susceptible to widening and avulsions (i.e., rapid changes in channel position and/or channel relocation) during moderate to high discharges, reestablishing a low-flow channel during subsequent low flows (USACE 2008).

The ephemeral washes occurring within the disturbance area present themselves as micro-floodplains with compound channels, which is a common arid stream system (USACE 2008). Within the disturbance area extended portions, the ephemeral drainage features are composed of very shallow compound channels with noncohesive sandy banks. The sandy substrate is composed of entisols and presents a high infiltration rate.

Because compound channel fluvial systems, such as the ephemeral washes occurring within the disturbance area, are subject to very wide fluctuations in discharges over a short period, their channels can frequently change configuration to accommodate large variations in surface flow because of storm events. As a result, arid fluvial systems usually exhibit long periods of little morphologic change interspersed with short-term dramatic changes in channel configuration. Therefore, arid stream geometry is more likely to be influenced strongly by a large event of low recurrence frequency (Allen 1999). The ephemeral washes do not support wetland hydrology because, outside of (remote) flooding events, the hydrology for the ephemeral washes occurring within the disturbance area is generally predictable (AECOM 2009b).

2.3.5 Groundwater Hydrology

The RSPP site is within the South Lahontan Hydrologic Region, which covers about 33,100 square miles of eastern California. One subdivision is the Indian Wells Valley (IWV) Groundwater Basin, which is located in the west-central portion of the South Lahonton Hydrologic Region and is bounded to the east by the Argus Range, to the south by the El Paso Mountains; to the west by the Sierra Nevada Range; and to the north by the Coso Range. The IWV Groundwater Basin is virtually closed, and there is very little groundwater underflow to or from adjacent valleys. The IWV is composed of two broad geologic units: consolidated rocks and unconsolidated deposits. The consolidated rocks are nearly impermeable except for areas where fracturing or weathering has occurred. These rocks are believed to yield little water to the overlying alluvial aquifer system. Previous investigations have divided the unconsolidated Quaternary deposits into two main aquifers: the shallow aquifer and the deep aquifer. Sediments of the shallow aquifer are as much as 300 feet thick and generally do not yield water readily. The deep aquifer may be at least 1,750 feet deep.

2.3.6 Water Quality

Water quality of the shallow aquifer is characterized by high concentrations of total dissolved solids. The deep aquifer is the sole drinking water supply in the valley. Storm water flows may reach China Lake, which is approximately 12 miles to the northeast of the RSPP site. Water quality data for China Lake were not reported in the Application for Certification.

2.3.7 Vegetation and Sensitive Habitats

Five vegetation communities and other land cover types were identified within the RSPP and are briefly described below (Figure 3). Acreages of each habitat types are based on data from the November supplemental BRTR (AECOM 2009c). Vegetation communities within the BRSA were classified based on Holland (1986). Sawyer and Keeler-Wolf (1995), and CDFG (2003b) classifications were used to provide additional detail when needed (EDAW AECOM 2009; AECOM 2009c).

2.3.7.1 Mojave Desert Wash Scrub

This vegetation community consists of an open to moderately dense evergreen scrub that attains a height of 3 to 6 feet. This community consists of three primary components: wash-dependent vegetation, vegetated ephemeral dry wash, and islands of Mojave creosote bush scrub. The dominant wash-dependent species and indicator plant of this community within the BRSA is scale-broom (*Lepidospartum squamatum*), which occurs in patches throughout the dry washes scattered amongst creosote bush (*Larrea tridentata*), spiny senna (*Senna armata*), cheesebush (*Hymenoclea salsola*), burro-weed (*Ambrosia dumosa*), Virgin River brittlebush (*Encelia virginensis*), and rayless goldenhead (*Acamptopappus sphaerocephalus*). Common herbaceous plants include California desert dandelion (*Malacothrix californica*), Fremont pincushion (*Chaenactis fremontii*), distant phacelia (*Phacelia distans*), and Wallace eriophyllum (*Eriophyllum wallacei*) (EDAW AECOM 2009).

A total of 72.6 acres of this community exist within the BRSA. Mojave Desert wash scrub is considered a sensitive vegetation community and water of the State by CDFG (AECOM 2009c).

2.3.7.2 Unvegetated Ephemeral Dry Wash

This land cover type consists of unvegetated washes that are dominated by sandy substrate and little to no perennial vegetation. Unvegetated ephemeral dry wash predominately occurs within the transition zone of desert wash scrub, in locations where the washes transition to sheet flow. No dominant perennial plant species, specifically scale-broom, which is the dominant indicator of Mojave Desert wash scrub, were observed in association with nonvegetated channel as these areas are primarily devoid of vegetation (EDAW AECOM 2009).

A total of 8.4 acres of this community exist within the BRSA (AECOM 2009c). Unvegetated ephemeral dry wash is a sensitive community as well as a jurisdictional water of the State.

2.3.7.3 Mojave Creosote Bush Scrub

This community type occurs on well-drained decomposed granite and volcanic soils, and consists of widely spaced shrubs up to 9 feet tall. This is the most common plant community within the BSRA, dominated by creosote bush, burro-weed, cheesebush, and Virgin River brittlebush. Common herbaceous species include redstem stork's bill (*Erodium cicutarium*), Mediterranean grass (*Schismus* sp.), needle goldfields (*Lasthenia gracilis*), and blue dicks (*Dichelostemma capitatum*) (EDAW AECOM 2009).

A large volcanic outcrop occurs southwest of the BSRA, where the Mojave creosote bush scrub becomes sparser and the herbaceous layer becomes more diverse. Vegetation associated with this outcrop includes such species as Parish's larkspur (*Delphinium parishii* ssp. *parishii*), snake's head (*Malacothrix coulteri*), and dwarf cottonrose (*Logfia depressa*). East of the central portion of the BSRA, large granite boulder outcrops occur within the Mojave creosote bush scrub. In this area, subshrubs such as desert brickellbush (*Brickellia desertorum*), Eastern Mojave buckwheat (*Eriogonum fasciculatum* var. *polifolium*), and Cooper's goldenbush (*Ericameria cooperi*) become more common (EDAW AECOM 2009).

A total of 9,506.9 acres of this community exist within the BRSA (AECOM 2009c).

2.3.7.4 Disturbed Habitat

Disturbed areas within the BSRA include areas where vegetation has been removed or otherwise degraded as part of routine road maintenance, off-highway vehicle (OHV) use, and other anthropogenic disturbances (AECOM 2009c).

A total of 10.6 acres of this community exist within the BRSA (AECOM 2009c).

2.3.7.5 Developed Areas

Developed areas within the BSRA consist of roadways and adjacent residential lots. Borders of paved roadways are highly managed and many of these areas are devoid of vegetation. Vegetation is also very limited on dirt roads; plants only occasionally grow along the center-line and are indicative of surrounding vegetation. A few residential lots occur adjacent to the BSRA to the northwest and more extensively to the northeast in association with the town of Ridgecrest. Plant composition on residential lots is primarily nonnative, especially within the residential development in the northeast portion of the BSRA (EDAW AECOM 2009).

A total of 150.3 acres of this community exist within the BRSA (AECOM 2009c).

2.3.8 Special-Status Plants

Thirteen special-status plant species have potential to occur within the BRSA; however, none were observed during seasonal focused surveys.

2.3.9 Special-Status Animals

The following nine special-status wildlife species were observed within the BRSA:

- Mojave Desert tortoise (*Gopherus agassizii*),
- Western burrowing owl (*Athene cunicularia hypugaea*),
- Loggerheaded shrike (*Lanius ludovicianus*),
- Le Conte's thrasher (*Toxostoma lecontei*),
- Yellow warbler (*Dendroica petechia*),
- Yellow-headed blackbird (*Xanthocephalus xanthocephalus*),
- Vaux's swift (*Chaetura vauxi*),
- American badger (*Taxidea taxus*), and
- Desert kit fox (*Vulpes macrotis arsipus*).

Yellow warbler, yellow-headed blackbird, and Vaux's swift were detected during their migration.

2.4 Project Effects

The following subsections briefly summarize the Project effects on jurisdictional waters, sensitive communities, and wildlife resources. For a full description of Project impacts on jurisdictional waters, sensitive communities and wildlife resources refer to the individual documents noted for each affected resource. The RSPP site plan has been reconfigured; as such, the impacts associated with the reconfigured site plan on jurisdictional waters, including construction of crossings and tie-ins, are being developed. An updated jurisdictional determination to address changes to the RSPP footprint as a result of the site plan reconfiguration is in progress. As described above, the impact calculations below are reflective of the November 2009 site plan for jurisdictional waters and will be updated for the redesigned Project area as biological surveys are completed. Impact calculations for DT and MGS habitat are based on the redesigned Project area.

2.4.1 Jurisdictional Waters

AECOM performed a formal jurisdictional delineation for the RSPP site to identify boundaries and acreages of regulated waters of State (AECOM 2009b). The RSPP would permanently affect waters of the State during construction grading within the disturbance area. Grading activities also have the potential to create airborne dust, sedimentation, and erosion.

Table 1 provides a summary of the affected jurisdictional waters as proposed by the November 2009 site plan. The area of permanently affected jurisdictional waters will likely decrease as the reconfigured site plan avoids most of El Paso Wash.

TABLE 1. PERMANENT IMPACTS TO STATE JURISDICTIONAL WATERS

State Jurisdictional Waters	Impacts (feet)	Impacts (acres)
Mojave Desert Wash Scrub	13,711.5	18.4
Unvegetated Ephemeral Dry Wash	12,568.1	9.7
Total	**26,279.6**	**28.1**

2.4.2 Sensitive Communities

While jurisdictional waters are considered sensitive communities, they are described above under Section 2.4.1, "Jurisdictional Waters." No other sensitive communities are found within the RSPP.

2.4.3 Mojave Desert Tortoise

The RSPP would affect DT habitat during construction grading and vegetation removal. The importance of a site to the DT local population and species is defined by the following factors.

1. Abundance of animals relative to other locations within the population;
2. Identified importance of the area for recovery and tortoise conservation, by the CDFG and USFWS;
3. Existing impacts to the site's DTs and relative longevity of the population in light of these impacts, irrespective of the Project;
4. Disruption to genetic connectivity within the population that would occur due to the Project.
5. Cumulative population fragmentation, including the Project, that could result in decreased value of the habitat surrounding the Project; and
6. Heightened anthropogenic or other impacts that could result should the Project be built.

There are no readily available DT density data for the Project vicinity, but several sampling programs suggest low to very low local DT densities. During surveys conducted in the spring of 2009, 40 DTs and 54 active burrows (18 occupied) were observed within the disturbance area, and 11 DTs and 17 active burrows (five occupied) were observed in the buffer area (AECOM 2009d; Figure 4). Estimated DT density at the RSPP site, based on 2009 surveys and prior to reconfiguration, is 8.1 adult DT per square kilometer (km^2) using the USFWS calculation (USFWS 2009b) and based on the 23 adult DT found in 1,734.8 acres (AECOM 2009d). Based on statistical data for nine mark-recapture plots in the western Mojave Desert (Karl 2002) and assuming comparable survey quality, the actual density may be somewhat less, potentially about 6 adult DT per km^2, or a total of about 38 adults, rather than the 57 estimated.

DT observations on and adjacent to the Project site are shown in Figure 4. Tortoises would be actively relocated from the RSPP prior to construction to reduce construction-related impacts to individuals. A separate relocation plan is being prepared.

The RSPP could affect local movement and reduce habitat connectivity of the DT. Although DT is not a migratory species, opportunities for local movements within their home ranges and juvenile dispersal are

important for maintaining viable populations. DT home ranges are small (25 to 200 acres) in relation to the entire disturbance area. Development of this site would not appear to impair physical connectivity within the population, since connections to the El Paso Mountains Pass to the south would be conserved by minimizing impacts to the El Paso Wash assuming that Project mitigation also ensures that (a) DT are not funneled onto the highway and Brown's Road along these corridors, and (b) OHV traffic does not increase in these washes.

The RSPP would further fragment occupied DT habitat. Unlike some species of birds and mammals that are known to abandon an area if habitat fragmentation were to reach a certain threshold, the threshold at which fragmented habitat would become undesirable or unusable by DT is generally unknown. Furthermore, mere habitat fragmentation (i.e., patch size and connectivity) is typically difficult to separate from the suite of impacts affecting DT use of a specific area. Although it does not appear that development of the RSPP would result in a level of fragmentation that would reduce surrounding habitat to unusable fragments, behavioral avoidance by DT of human-made structures and associated edges can deter movement and functionally decrease connectivity. In addition, the RSPP may indirectly affect movement through DT avoidance of artificial light and increased noise, or changes in daily activities in response to human presence. Indirect impacts to DT would occur from increased common raven (*Corvus corax*) presence associated with the construction of new elevated perching and nesting sites (e.g., new transmission line towers, perimeter fencing). Development of new elevated perching and nesting sites could increase the probability that young ravens remain in the area thus increasing the overall raven population size, which, in turn, could result in increased predation on DT near the disturbance area. Additionally, garbage resulting from increased human presence associated with the RSPP could attract more ravens. Ravens are already common in the area (A. Karl, pers. obs.), undoubtedly due to the subsidies provided by the town and agriculture (e.g., trash, roadkills, harvesting and tilling practices that provide prey and forage, water). These ravens likely already influence recruitment in the local DT population. For instance, clearance of DT for the Hyundai Test Track south of California City, where ravens are common due to the nearby towns (California City and Mojave) and the Mojave landfill, found no DT between the reproductive-sized DT and the very small (<a few years old) juvenile stage. There appeared to be total lack of recruitment into this population, possibly due to raven predation. Any increases in raven populations as a result of the Project could amplify the effect of the birds on DT. A separate raven management plan is being prepared to address these potential effects. Other indirect impacts would result from invasive plants that outcompete native plants, or from increased incidence of accidental wildfires, both of which could reduce foraging habitat for DT.

Although the Project disturbance area does not occur within any of the four DT Desert Wildlife Management Areas (DWMAs) designated by the WEMO (the closest DWMA, the Fremont-Kramer DWMA, is located approximately 7 miles southeast of the BRSA), or within any designated DT critical habitat (the nearest DT critical habitat is over 7 miles south of the BRSA), the Project disturbance area does occur entirely within the DT Western Mojave Recovery Unit (USFWS 2008). The entirety of the disturbance area as well as the majority of the BRSA contain suitable habitat for DT. The topography and landscape of the Project disturbance area are generally flat, with a few large washes in the central portion. Within the Project disturbance area, there is a total of approximately 1,944.1 acres of habitat suitable for DT. The Project disturbance area, with the exception of developed lands, is considered occupied DT habitat (1,944.1 acres), with 7.9 acres of lower quality due to disturbed habitat adjacent to roadways along the proposed pipeline alignment. Table 2 shows the amount and quality of habitat affected by the RSPP.

TABLE 2. IMPACTS TO MOJAVE DESERT TORTOISE HABITAT

Species	Total Impact (acres)	Low-Quality Habitat* (acres)	Moderate-/High-Quality Habitat* (acres)
Total Impact (acres)	1,944.1	7.9	1,936.2

* Low-quality habitat includes disturbed habitat adjacent to roads along the proposed pipeline route.

2.4.4 Western Burrowing Owl

Based on spring 2009 data, construction grading and vegetation removal in the disturbance area would permanently impact WBO. One pair, four individuals, and six active burrows were observed during spring 2009 surveys (AECOM 2009c; Figure 5). The entire disturbance area is considered suitable WBO foraging and nesting habitat, with the exception of the rocky outcrops in the central-eastern portion of the disturbance area (AECOM 2009a). In the buffer area, one pair and one active burrow were found (AECOM 2009c). As with the DT, indirect impacts could result from increased common raven and raptor predation (AECOM 2009a).

2.4.5 Mohave Ground Squirrel

The RSPP could result in permanent, direct impacts to MGS (*Spermophilus mohavensis*), if they occur within the disturbance area. No focused surveys for MGS were conducted and there are no previous documented occurrences within the RSPP site. Project biologists conducting surveys for other special-status species did not report any MGS during 2009 surveys (AECOM 2009a).

Direct impacts on MGS would include the permanent loss of potentially suitable MGS habitat, including 102.6 acres of potential high-quality habitat (see Table 3; Figure 6). Indirect impacts to MGS could occur from reduced habitat connectivity although reconfiguration of the site plan avoids the highest quality habitat for MGS within El Paso Wash, providing a potential movement corridor. Other indirect impacts could also result from a potential increase in opportunistic predators (e.g., coyotes [*Canis latrans*]) because of garbage generated from increased human presence associated with construction, increased incidence of invasive plants that outcompete native plants, or from accidental wildfires (potentially caused by construction or downed new transmission wires) (AECOM 2009a).

According to the WEMO, the portion of the RSPP disturbance area south of Brown Road overlaps with the Mohave Ground Squirrel Conservation Area; this area of overlap totals approximately 806 acres based on the reconfigured site plan, of which approximately 795 acres are MGS habitat of various quality (approximately 11 acres is considered unsuitable habitat).

Table 3 shows the amount and quality of MGS habitat affected by the RSPP according to the reconfigured site plan.

TABLE 3. IMPACTS TO MOHAVE GROUND SQUIRREL HABITAT

Species	Total Impact (acres)	Low-Quality Habitat (acres)	Moderate-Quality Habitat (acres)	High-Quality Habitat (acres)
Mohave Ground Squirrel: *Within MGS Conservation Area*	794.7	284.1	439.2	71.4
Mohave Ground Squirrel: *Outside MGS Conservation Area*	1,127.9	139.5	957.2	31.2
Total Impact (acres)	***1,922.6***	***423.6***	***1,396.4***	***102.6***

Note: MGS = Mohave ground squirrel

3.0 MITIGATION PLANNING AND DESIGN

3.1 Goals and Objectives

Mitigation options are under evaluation in consultation with CDFG, BLM, and USFWS. Compensatory mitigation for the RSPP would be achieved through a combination of offsite land acquisition, offsite habitat enhancement, and funding programs that benefit the special-status wildlife species that would be affected by implementation of the Project. A combination of land acquisition and funding of preservation and enhancement through management would be important in the overall compensatory mitigation approach.

Land acquisition involves securing and preserving unprotected lands via a Conservation Easement to facilitate the conservation of the resource (i.e., wildlife, vegetation, or jurisdictional waters) in perpetuity. Land acquisition may occur through two primary mechanisms: 1) purchase of private lands or 2) payment of a fee to a third party for the purchase of lands. In either approach, the costs associated with land acquisition would be the responsibility of the permittee (i.e., Project owner) and would include not only the cost of the land parcels to be acquired, but also fees for the initial enhancement and continued long-term management and monitoring (via a nonwasting endowment) of those lands by a third party in perpetuity. Acquired land would be preserved and managed for the biological resource or species habitat values in perpetuity.

The location of lands to be acquired for compensation would be determined based on consultation with the resource agencies (CDFG, USFWS, CEC, and BLM). Priority lands for acquisition would be identified using the following criteria:

- *Species occurrences and habitat quality.* Acquisition efforts shall focus on protecting habitat of adequate quality for special-status species impacted by the Project (see Species-specific Habitat Quality Criteria, below) that, at minimum, provides functions and values equal to those present on the Project site. Where possible, preservation of high-quality occupied habitat that satisfies the mitigation requirements for DT, MGS, and WBO will be given highest priority.

- *Location*. Priorities for acquisition would include lands in the vicinity of the Project site (i.e., within the same or adjacent watershed).

- *Landscape position*. Priorities for acquisition would include 1) lands that preserve key movement corridors, or 2) areas that contribute to the connectivity between other preserved or high-value sites for impacted species (e.g., critical habitat, known population sites, or other preserve lands).

- *Maximum size*. Acquisition parcels shall be as large as possible to maximize ecosystem functions on site, population sizes of special-status species, and protection of species from adjacent land uses and edge effects. Opportunities for augmentation of existing preserved land would be considered a high priority. Also, consideration of the future potential for consolidation of acquisitions within a larger management framework would be considered. Larger preserves allow for greater efficiency and effectiveness in implementing large-scale enhancement or restoration actions, and preserve management.

- *Land designation*. Important areas identified in Federal species recovery plans (e.g., within DT critical habitat), or species-specific conservation strategies (e.g., within or adjacent to known or core MGS populations).

- *Presence of invasive species.* Invasive species that are likely to jeopardize habitat functions and values must not be present at a sufficient density to impact site quality as it pertains to use of the site for compensatory mitigation.

- *Vegetation community composition.* Vegetation community composition on potential mitigation lands, including the presence of desert washes, should be representative of communities present on the Project site, if possible.

- *Enhancement opportunities*. Lands that are presently limited in habitat value may be considered priorities for acquisition if they can be feasibly enhanced or restored to functional, high-quality habitat, and would contribute to regional connectivity of populations or important habitats.

- *Other property constraints*. Acquisition efforts would avoid lands, to the extent feasible, with lease rights or other liens that would be contradictory to the purpose of using the property for special-status species protection (e.g., mineral leases, water rights, natural gas drilling easements) or with the presence of cultural or other resources on site that would limit potential options for special-status species protection. There may be a workable solution around these constraints on some lands.

- *Long-term management feasibility*. Priority acquisition lands would occur under the purview of a reputable land management entity that is solvent, and with strict assurances that the property would be preserved in perpetuity (e.g., conservation easements).

- *Contribution to the goals of the Desert Renewable Energy Conservation Plan (DRECP)*. The State of California and the U.S. Department of Interior are cooperatively developing the DRECP. The DRECP will establish a science-based process for reviewing, approving, and permitting renewable energy applications in California. The DRECP will create a government-organized habitat mitigation program that consolidates habitat purchases for compensatory mitigation. Land acquisition to mitigate for impacts of the RSPP shall focus on parcels that would contribute to DRECP goal attainment, where feasible.

Additional surveys of potential mitigation sites (e.g., DT surveys, MGS habitat assessment, etc.) would be conducted to evaluate conditions relative to some of the above-mentioned factors (e.g., species occurrences and abundance, habitat quality, etc). Species-specific criteria for evaluating habitat quality on potential mitigation lands are included below.

The ultimate goal is to acquire compensatory lands that would offset the loss of the biological values associated with construction and operation of the RSPP that cannot be avoided. As potential

compensatory lands are identified, the RSPP team would coordinate closely with CEC, CDFG, USFWS, and BLM in an attempt to obtain consensus that the targeted lands are suitable. During the mitigation site selection process, close collaboration would also occur with nonprofit entities known to participate in mitigation planning within the Mojave Desert. Specific opportunities that could be considered for land acquisition in reasonable proximity to the RSPP site include private lands that would augment the DT Natural Area preserve (located approximately 25 miles south of the RSPP site), and private lands adjacent to CDFG-owned parcels on Little Dixie Wash (located just west of the RSPP site; Figure 7).

As part of the process leading up to the acquisition of compensation lands, a Property Analysis Record (PAR), or a PAR-like analysis, will be conducted. The PAR models the anticipated costs associated with the acquisition of land, as well as management expenses, while accounting for escalation in costs associated with inflation. The PAR would analyze the characteristics of a target property, and the associated costs required to manage the site (e.g., fencing, habitat enhancement, monitoring, etc.). The end result of the PAR model would be an accurate estimate of the long-term endowment costs that would be required to fully implement all compensation measures.

In addition to, or possibly a substitute for, land acquisition, described above, the proposed compensatory mitigation approach for impacts to special-status species would include the payment of a fee on a per-acre basis. The fees may be paid to an existing in-lieu fee program. Or, in the absence of a State in-lieu fee program, fees may be donated to a nongovernmental organization (NGO) and would be designated for specific activities that would promote recovery and/or preservation of the impacted species in the region. Donating funds to a private organization will be subject to prior approval by CDFG and USFWS and shall be supported by a contract or agreement detailing the amount and specific purpose of the funds being donated. Funded activities could include, but are not limited to, the following:

- Habitat enhancement of existing preserved lands (e.g., revegetation, invasive plant control);
- Exclusion or reduction of key disturbance sources (e.g., livestock grazing, predators, OHVs);
- Reduction of mortality sinks (e.g., roadways and linear barriers);
- Research studies and monitoring;
- Captive breeding and release programs; and
- Public information and education programs.

Some potential mitigation opportunities for the RSPP identified to date are summarized below.

- Install fencing along major roadways bordering important population areas in Kern County (e.g., U.S. Highway 395).
- Construct and monitor effectiveness of wildlife crossings under Brown Road and U.S. Highway 395 in the vicinity of the Project site. Crossings would be designed to facilitate safe passage of DT and MGS across roads in the vicinity of the Project site.
- Fund a radiotelemetry MGS movement study in the Western Mojave area to evaluate the movement of MGS between key population areas, within the MGS Habitat Conservation Area (HCA), and between the MGS HCA and lands outside the HCA. This study would help to better characterize key lands for connectivity and wildlife movement and facilitate more accurate target areas for land acquisition, preservation, and management
- Designate funds to facilitate and enhance raven monitoring, management, and control through the regional raven management program in development by USFWS and supporting agencies. This fee may be directed to USFWS to be applied as part of a new in-lieu fee program being developed. BLM may also be able to use funds to support raven management at recreational areas that attract ravens and could impact surrounding mitigation lands.
- The revised draft Desert Tortoise Recovery Plan was issued in 2008 (http://ecos.fws.gov/docs/recovery_plan/080804.pdf) and identifies several “Recovery Actions” for

facilitating the protection and recovery of the species. The cost of the recovery is estimated to be a couple hundred million dollars and no firm source of funding has been identified. Recovery actions outlined in the Desert Tortoise Recovery Plan include:

- Increasing law enforcement;
- Closing roads that provide access to DT habitat through fencing;
- Excluding and eliminating burros and horses from DT habitat;
- Funding monitoring programs (i.e., establish a grant for monitoring); and
- Funding applied research that contributes to the long-term viability and conservation of DT (e.g., setting up a grant for graduate students to do research on the species).

Funds from the fee-based portion of the proposed mitigation strategy could be used to establish or contribute to funding in perpetuity for any of the above actions. The funds would be earmarked for support of the DT and specific recovery actions, and provided to a third party (e.g., Desert Tortoise Preserve Committee, Inc. [DTPC], Wildlands, Inc., or other NGO) for management as appropriate.

3.1.1 Compensation Ratios

Compensation ratios are proposed below to serve as a guideline for evaluation of offsite land acquisition opportunities. These ratios are based on the quality of onsite habitats that will be affected by the Project and ratios that have been negotiated on similar projects. In some cases a fee-based equivalent is recommended to augment offsite land acquisition to fully satisfy anticipated mitigation requirements. Proposed mitigation ratios are summarized in Table 4.

3.1.1.1 Jurisdictional Waters

Mitigation for impacts to 28.1 acres of State waters will consist of acquisition, preservation, and enhancement through management of a minimum of 46.5 acres of desert wash to achieve a 2:1 compensation ratio for Mojave desert wash scrub (impacts=18.4 acres) and 1:1 ratio for unvegetated ephemeral dry wash (impacts=9.7 acres). This ratio may be achieved through a combination of vegetated and unvegetated waters dependent on the site-specific characteristic. The overall aquatic resource mitigation ratio combined with enhancement opportunities will be given priority to identifying a site with exact in-kind acreage replacement.

3.1.1.2 Wildlife

Mitigation for impacts to 1,922.6 acres of MGS habitat will consist of acquisition, preservation, and enhancement through management of a minimum of 7,078.2 acres or acreage equivalent fees to achieve a 5:1 compensation ratio for all potential habitat within the WEMO MGS Conservation Area, (impacts = 794.7 acres), a 3:1 ratio for moderate- and high-quality habitat outside the WEMO MGS Conservation Area (impacts = 988.4 acres), and a 1:1 ratio for low-quality habitat outside of the WEMO MGS Conservation Area (impacts = 139.5 acres). A 5:1 compensation ratio is proposed for low-, moderate-, and high-quality habitat within the WEMO MGS Conservation Area to maintain consistency with WEMO Plan requirements. However, the ratios required by the WEMO Plan do not account for finer scale habitat variability as demonstrated by the MGS habitat quality analysis completed for the RSPP site by Phil Leitner PhD (2009). As shown on Figure 6, a higher concentration of low-quality habitat is present within the WEMO designated MGS Conservation Area, suggesting that a 5:1 ratio for the Project impacts in this area likely overcompensates for Project effects on the species.

Mitigation for impacts to 1,944.1 acres of DT habitat will consist of acquisition, preservation, and enhancement through management of a minimum of 5,816.5 acres or acreage equivalent fees to achieve a 3:1 compensation ratio for DT occupied habitat (impacts = 1,936.2 acres), with the exception of low-quality habitat (highly disturbed, adjacent to roads) that is proposed at a 1:1 ratio (impacts = 7.9 acres). The mitigation ratio (3:1) for occupied DT habitat is consistent with current trends on large-scale solar projects (e.g., Ivanpah), though the RSPP has greater inherent threats than other solar sites and

TABLE 4. SUMMARY OF PROPOSED COMPENSATORY MITIGATION FOR RSPP

Resource		Impact Acreage or Linear Feet			Mitigation Proposal	
		Total Impact	Impact by Quality		Ratio	Acreage or Acreage Equivalent
Desert Tortoise (DT)	*Outside Desert Tortoise Critical Habitat*	1,944.1	H	1,936.2	3:1	5,808.6
			L	7.9	1:1	7.9
	Total:	**1,944.1 acres**			**NA**	**5,816.5**
Mohave Ground Squirrel (MGS)	*Within MGS Conservation Area*	794.7 acres	H	510.6	5:1[2]	2,553
			L	284.1	5:1	1,420.5
	Outside MGS Conservation Area	1,127.9 acres	H	988.4	3:1[2]	2,965.2
			L	139.5	1:1	139.5
	Total:	**1,922.6 acres**			**NA**	**7,078.2**
Western Burrowing Owl (WBO)[3]		1 pair; 4 individuals			6.5 ac each[4]	32.5
Jurisdictional Waters[7]	Mojave Desert wash scrub	18.4 acres			2:1	36.8
	Unvegetated ephemeral dry wash	9.7 acres			1:1	9.7
	Total:	**28.1 acres**			**NA**	**46.5**
TOTAL		NA[5]			NA[5]	

Notes:

NA Not Applicable

H Higher Quality Habitat (habitat that would necessitate higher mitigation ratios within the category)

L Lower Quality Habitat (habitat that would justify lower mitigation ratios within the category)

1 The mitigation acreage/fee would not be additive where multiple species and habitat exist on site, or where conservation areas for species overlap (p. 2–35, WEMO BLM).

2 WEMO Recommended Mitigation.

3 Mitigation will also need to include the replacement (construction) of burrows at 2:1 ratio (2 burrows created for each burrow impacted).

4 Acres per pair or individual. This ratio assumes Project proponent will find occupied habitat.

5 The total impact/mitigation acreage is not provided because it is not additive. Impact acreages for each resource overlap.

6 The total acreage assumes land acquired can concurrently mitigate for DT, Mojave fringe-toed lizard, WBO and jurisdictional waters.

would warrant consideration of lower ratios. The mitigation ratio proposed for highly disturbed lands is also considered to be conservative as the WEMO would dictate a 0.5:1 ratio for DT impacts associated with disturbed lands.

Mitigation for impacts to one pair and four individual WBO will consist of acquisition, preservation, and enhancement through management of a minimum of 32.5 acres of suitable, occupied habitat. Mitigation will also include replacement of burrows at a 2:1 ratio for each active burrow impacted. If habitat is not occupied, the mitigation requirement will be increased per California Burrowing Owl Consortium guidelines, although it is assumed that land acquired for DT and MGS mitigation will more than meet the mitigation needs for WBO.

3.2 Habitat Preservation Needs and Management Strategies

The following section discusses the habitat requirements, preservation needs, enhancement options, and suitable land management strategies for sensitive species and habitats that require mitigation. These principles are approached from a regional perspective and will guide mitigation site selection and HMP development. They will be further developed and refined in the Conceptual HMP to be provided once a mitigation site is chosen.

3.2.1 State Waters

The proposed mitigation for permanent Project impacts to State waters may include a combination of preservation/conservation, and restoration and enhancement activities, including physical restoration if necessary, exotic species removal and control, and supplemental planting and seeding as appropriate. Because of ephemeral and highly variable conditions within a desert setting, establishing physical conditions that promote natural recruitment is considered ecologically preferable for establishing appropriate self-sustaining habitat as compared to planting and use of temporary irrigation. Desert systems are complex as they experience flashy hydrology and are often shaped by severe rain events that occur infrequently. Lichvar et al. (2006) have described “ordinary” events that define bed and bank limits in Arid West channels as typically corresponding to the 5- to 8-year event, as opposed to the 1- and 2-year event in temperate climates (USACE 2007). Physical restoration promotes natural processes and native revegetation and may include the creation of sinuous, possibly anastomosing channels in addition to the creation of gravel bars and interfluves.

3.2.2 Desert Tortoise

DT are found in many different dry habitats, from flats and slopes dominated by creosote bush (*Larrea tridentata*), scrub at lower elevations to rocky slopes characterized by blackbrush (*Coleogyne ramosissima*), and juniper (*Juniperus* spp.) at higher elevations. However, DT require friable soil to dig burrows. Burrows are necessary to the life history of DT, as they provide cover from predators and extreme temperatures, as well as nesting places. During the winter they can opportunistically use other types of cracks, crevices, and overhangs for cover as well. DT feed on perennial grasses, woody perennials, and cacti, as well as nonnative species such as red brome (*Bromus rubens*) and red-stem filaree (*Erodium cicutarium*) (USFWS 2008).

Suitable landscapes for DT are generally defined as alluvial fans and plains and rocky slopes at elevations of 1,969 to 3,937 feet above sea level (USFWS 2008). While there have been studies regarding slope and aspect preference for DT (Weinstein 1989; Andersen et al. 2000), DT choose sites based on surface conditions, which are influenced by a complex interaction between climate and topography (Nussear et al. 2009).

The RSPP site is located in the northern limits of the West Mojave Recovery Unit (USFWS 1994b). Four DT subpopulations occur south of the RSPP site that have been identified as part of this recovery unit (USFWS 1994b), and DT within these subpopulations have been characterized as variable and patchy with some areas containing high densities of DT while others contain low densities (BLM 2005). DT population densities outside these subpopulations, however, are very low (BLM 2005).

Critical habitat for DT was designated in 1994 (USFWS 1994a). The Primary Constituent Elements of critical habitat identified in the designation include:

- Sufficient space to support viable populations within each of the six recovery units and provide for movements, dispersal, and gene flow.
- Sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species.
- Suitable substrates for burrowing, nesting, and overwintering.
- Burrows, caliche caves, and other shelter sites.
- Sufficient vegetation for shelter from temperature extremes and predators.
- Habitat protected from disturbance and human-caused mortality.

The suitability of potential offsite mitigation lands as habitat compensation for Project impacts to DT would be based on the following criteria:

- Within current occupied range of species.
- Within same population and genetic unit as the Project site (e.g., within the Western Mojave Recovery Unit and preferably within the same or adjacent watershed).
- Similar vegetation species/community composition to the Project site, or, if the habitat at the Project site is highly disturbed (including regrowth), then shrub cover consistent with occupied habitat in the region would be preferred.
- Sufficient shrub cover to provide thermal cover and establishment of an herbaceous layer as forage for DT.
- Presence of abundant and diverse native herbaceous plant cover (as forage).
- High cover site potential, relative to both topography and soils (e.g., burrows, caliche caves, and other shelter sites).
- Friable (e.g., alluvial) soils for burrows (shelter, nests, and overwintering); however, habitat quality decreases with extremely sandy soils that do not support burrow construction.
- Habitat with limited anthropogenic disturbance and sources of mortality (e.g., preference for sites where the following threats are absent or of limited influence: livestock or feral horse/burro grazing, roadways, fences or other movement barriers, OHV use, raven predation, trash dumping, chemical contamination, etc).
- Sufficiently far from development (e.g., equal or greater distance from development than proposed Project site).
- Compatible adjacent land uses. Preserved and undeveloped lands are the highest priorities for adjacent land uses, or conditions that allow for effective boundary defensibility from adjacent threats.
- Within relative proximity to critical habitat, and/or with potential for connectivity between or among critical habitat.
- Existing species occupancy, or likely occupancy based on habitat suitability and occupancy of adjacent lands.

Measures for the management and enhancement of DT habitat will be implemented as appropriate depending on the site conditions at the chosen mitigation areas. Such measures may include:

- Control of raven populations to reduce predation of DT.
- Control or elimination of grazing by domestic animals to prevent soil compaction, erosion, and the loss of DT forage plants.
- Maintenance of open patches of short vegetation with optimal vegetation heights attractive to MGS and WBO, less than 12 inches.
- Control of wild horse and burro populations within mitigation areas.
- Elimination of OHV use and other human disturbance through fencing, signage, and patrolling.
- Prohibition of any new road construction, paved or otherwise, within mitigation areas.
- Installation of DT-friendly barrier fencing and/or undercrossings at existing highways.
- Prevention of poaching and illegal collection of DT.
- Control of invasive species such as Saharan mustard, Mediterranean grass, and other exotic annual grasses and forbs.
- Restoration of mitigation areas with native vegetation.
- Development and implementation of a fire management plan for mitigation areas where DT habitat may be impacted by fire.
- Prohibition of the release of captive DT into mitigation areas to prevent the spread of disease, genetic contamination, and competition with the resident population of DT. Agency authorized relocations may be permitted.
- Control and cleanup of illegal dumping.
- Removal and remediation of toxicants and unexploded ordnance.
- Control of unleashed and feral dogs that may cause mortality or disturbance to DT.

3.2.3 Western Burrowing Owl

Suitable WBO habitat consists of annual and perennial grasslands, deserts, and scrublands characterized by low-growing vegetation (Zarn 1974; CBOC 1993; Haug et al. 1993). Suitable WBO habitat may also include trees and shrubs if the canopy covers less than 30 percent of the ground surface (DeSante et al. 1996). Burrows are the essential component of WBO habitat, and both natural and artificial burrows provide protection, shelter, and nests for WBO. WBO typically use burrows made by mammals such as kit foxes, ground squirrels, or badgers, but also may use human-made structures, such as cement culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement (Collins and Landry 1977; Trulio 1994). Where the ranges of WBO and DT overlap, WBO also use DT burrows.

WBO in California are generally nonmigratory and most abundant in the Central and Imperial valleys, primarily in agricultural areas (Center for Conservation Biology et al. 2003). Small, scattered populations occur in the Mojave Desert. Although the WBO population in the southern desert region is primarily resident (i.e., present year-round), some migration from northern populations to this area occurs during winter (Center for Biological Diversity et al. 2003 citing Garrett and Dunn 1981). Seasonal nonmigration movements and shifts in burrow use by juveniles and adults within a region also occur. The West Mojave Plan documents 53 records of WBO in the east Mojave Desert (Campbell 2004), only five of which are confirmed breeding pairs. Population density seems to be correlated with prey availability, particularly small mammals (Klute et al. 2003).

The suitability of potential offsite mitigation lands as habitat compensation for Project impacts to WBO would be based on the following criteria:

- Within current range of species.
- On flat to moderately sloping terrain.
- Within relative proximity to the Project site (e.g., preferably within the same or adjacent watershed, or within Kern County).
- Less than 30 percent shrub and/or tree cover.
- Presence of suitable (e.g., natural or artificial) burrows for nesting.
- Existing species occupancy and abundance.

Measures for the management and enhancement of WBO habitat will be implemented as appropriate depending on the site conditions at the chosen mitigation areas. Such measures may include:

- Elimination of human disturbance through fencing, signage, and patrolling.
- Control of invasive species such as Saharan mustard, Mediterranean grass, and other exotic annual grasses and forbs.
- Restoration of mitigation areas with native vegetation.
- Protection of ground squirrel colonies within mitigation areas through prohibition of poisoning, gassing, and other rodent controls.
- Installation of artificial burrows in mitigation areas to augment natural burrows.
- Elimination of pesticide use that may diminish WBO insect and rodent prey populations.
- Restoration activities with potential to disturb WBO should not occur during the breeding season (February 1 through August 31).

3.2.4 Mohave Ground Squirrel

This species is most often associated with Mojave creosote bush scrub, which typically supports abundant herbaceous annuals but also inhabits desert saltbrush scrub, shadscale scrub, desert greasewood scrub, and Joshua tree woodland (BLM 2005; MGSWG 2006). Regional availability of water also has an impact on large-scale habitat preferences. Within its range, MGS inhabits flat to moderate desert terrain, including alluvial fans, basins, and plains with deep sandy or gravelly friable soils with an abundance of native herbaceous vegetation. Habitat quality decreases with extremely sandy soils that do not support burrow construction. MGS primarily feeds on green vegetation and seeds of shrubs and forbs but may also eat invertebrates (BLM 2005).

High-quality habitat includes a diversity of shrub species, native herbaceous plants, and sandy or loamy soils (often with large soil accumulations at the bases of shrubs) that provide suitable substrate for burrow construction (Leitner 2009). MGS can forage in a variety of habitats but require high-quality drought refugia, characterized the presence of three plants: spiny hop-sage (*Grayia spinosa*), winterfat (*Krascheninnikovia lanata*), and saltbush (*Atriplex* spp.), which provide food during years of low rainfall and in parts of the year when herbaceous annuals are not available (Leitner and Leitner 1998). Movement corridors between refugia for juvenile dispersal and repopulation of lower quality habitat during nondrought years are also very important for persistence of the species (Stewart 2005).

The general region around the RSPP site is notable for the abundance of MGS records (Leitner 2008). The broad valley to the southwest of Inyokern along Little Dixie Wash has been identified as one of only four known MGS core areas. This core area extends to within 2 to 3 miles of the western edge of the BLM ROW on which the Project is located. Another population has been documented from Ridgecrest east along State Route 178, based on records at 11 locations since 1998. MGS occurrences in the vicinity of Project are concentrated in Indian Wells Valley, located north of the site. The species is expected to occur elsewhere in this valley, although much of the area has not been surveyed (Leitner 2009).

The suitability of potential offsite mitigation lands as habitat compensation for Project impacts to MGS would be based on the following criteria:

- Within current range of MGS with evidence that the site is occupied by the species.
- On flat to moderately sloping terrain.
- Within reasonable proximity to the Project site (e.g., preferably within the same or adjacent watershed).
- Presence of shrub layer that includes species known to be used as forage (e.g., winterfat [*Krascheninnikovia lanata*], spiny hopsage [*Grayia spinosa*], saltbush [*Atriplex* sp.]) and larger shrubs that provide cover and protection against temperature extremes.
- Presence of abundant and diverse native herbaceous plant cover (as forage).
- Presence of friable (e.g., alluvial) soils that are suitable for burrow construction (nesting, shelter, hibernation). Soil suitability decreases with extremely sandy soils. Additionally, MGS are not known to use desert pavement and generally do not inhabit rocky areas; hence, such areas would be avoided.
- Habitat with limited anthropogenic disturbance and sources of mortality (e.g., preference for sites where the following threats are absent or of limited influence: livestock or feral horse/burro grazing, roadways, fences or other movement barriers, OHV use, raven predation, trash dumping, chemical contamination, etc.).
- Sufficiently far from development (e.g., equal or greater distance from development than proposed Project site; therefore, greater than 5 miles from development).
- Compatible adjacent land uses. Preserved and undeveloped lands are the highest priorities for adjacent land uses.
- Landscape position/connectivity. Preferred sites would be within identified core or known occupied population areas, or in areas that connect known/core populations or other high-quality sites (see Figure 7).

Measures for the management and enhancement of MGS habitat will be implemented as appropriate depending on the site conditions at the chosen mitigation areas. Such measures may include:

- Sufficient quantity and quality of drought refugia with the forage species such as spiny hop-sage, winterfat, and saltbush.
- Proper soil conditions to provide for burrowing opportunities.
- Preservation of migration corridors necessary for juvenile dispersal and movement between refugia.
- Elimination of OHV use and other human disturbance through fencing, signage, and patrolling.
- Control of invasive species such as Saharan mustard, Mediterranean grass, and other exotic annual grasses and forbs.
- Restoration of mitigation areas with native vegetation.
- Control of domestic or feral animals that may cause mortality or disturbance to MGS.
- Limitation of nearby rodent-control measures such as poisoning or gassing that may cause mortality.
- Control or elimination of grazing by domestic animals to prevent loss of MGS forage plants.
- Minimization of roadways that fragment habitat and may result in vehicle-related mortality.

4.0 IMPLEMENTATION PLAN

The mitigation implementation plan will be developed and described in the Conceptual HMP once a mitigation site is chosen as these activities will be tailored to site-specific conditions. A preliminary mitigation design approach and possible techniques are described below. The Conceptual HMP will include the following elements:

- Specific mitigation goals and objectives for the site,
- Basis for conceptual plan and description of reference sites,
- Restoration/enhancement design,
- Planting and irrigation plan,
- Site preparation and weed control,
- Revegetation planting prescriptions,
- Mulching,
- Plant protection,
- Irrigation,
- Grazing management,
- Predator control,
- Construction monitoring,
- Implementation schedule, and
- Maintenance during establishment period.

4.1 Preliminary Mitigation Design Approach and Techniques

4.1.1 State Waters

Streams on a potential mitigation site will be identified that have experienced physical degradation such as incisement, erosion, and loss of native vegetation. If and where enhancement is necessary, the design of the mitigation area would mimic the existing and/or reference site landforms and may include facilitating establishment of a meandering low flow path and subtle depressions and hummocks (i.e., +/- 1 foot) with a balanced cut and fill approach. The hummocks would act as water bars perpendicular to the flow to promote channel meandering, braiding, and topographic complexity. This initial subtle grading and contouring within a wash would be expected to slow runoff within the wash and create microhabitats, including seasonal pockets of moisture retention that would promote functions such as nutrient cycling and subsurface recharge. Wash bottom contouring is intended to establish and promote continued micro-topographic complexity when the wash experiences future storm events. If feasible, onsite enhancement may occur within El Paso Wash reducing the extent of offsite enhancement necessary.

Physical restoration may also involve recontouring the banks of a wash with hand or motorized equipment and use of rock and/or bioengineering techniques (e.g., vegetation bundles) in the channel and along the bank to restore natural stability (e.g., balanced sediment scour and deposition). Physical restoration will create favorable conditions for germination and suitable habitat for wash-dependent vegetation species that may take 5 years or more to successfully recruit and mature to required densities.

The purpose of this type of restoration is to return natural successional processes to an area to support successful native plant recruitment and revegetation and replicate the functions and wildlife values of a natural desert wash. Removing and controlling invasive exotic species that threaten or exclude native vegetation enhances the functions of a desert wash by restoring natural flow regimes and providing substrate for native plants to regenerate naturally. As an added benefit, removing and controlling invasive exotic species in a specific area often benefits the entire system by removing the input of invasive weed propagules to downstream reaches. Exotic species removal involves identifying target species, removing the identified species, and allowing areas to revegetate through natural recruitment or supplemental planting and seeding. The California Invasive Plant Council (Cal-IPC) provides a list of nonnative plants identified to be ”threats to California Wildlands” (Cal-IPC 2007). This serves as a guide for species that will be targeted for removal and control.

Supplemental planting and seeding can be paired with the mitigation techniques mentioned above or occur alone if appropriate. Supplemental planting and seeding with native plants locally adapted to an area enhances the value and function of an existing or restored wash by reducing erosion and increasing native plant diversity and structure. Wildlife habitat value is also increased by providing refuge for wildlife from desert heat, and increasing foraging and nesting opportunities for birds and other wildlife. Due to irrigation limitations in the desert, supplemental native planting and seeding should only be considered as a secondary supplement to physical restoration and invasive species removal.

4.1.2 Desert Tortoise

Suitable habitat for DT, including areas with friable soil; appropriate vegetation for foraging and cover; and existing refugia such as burrows, or other types of cracks, crevices, and overhangs, will be identified, quantified, and mapped on the mitigation site. Onsite habitat that is of high quality will be protected and maintained. Protection of this habitat can include measures to maintain a disturbance-free environment with the exclusion of recreational activities; removal of invasive species and exotic predator control; and improvements to adjacent, lesser quality habitats to create additional habitat connectivity.

Onsite habitat that is of moderate or lower quality will be enhanced through measures including control of exotic plant species and exotic predators, elimination of onsite activities that could further degrade the quality of habitat, such as human recreational uses; removal of any movement barriers that may exist; creation or enhancement of refugia habitat, including planting native vegetation; and removal of habitat degrading elements, such as grazing hoofstock, feral dogs, and debris.

4.1.3 Western Burrowing Owl

Suitable habitat for WBO, including existing burrows, appropriate vegetation, and existing prey base, will be identified, quantified, and mapped on the mitigation site. Onsite habitat that is of high quality will be protected and maintained. Protection of this habitat can include measures to maintain a disturbance-free environment with the exclusion of recreational activities; removal of invasive species and exotic predator control; protection of burrowing rodents through elimination of rodent control efforts; and improvements to adjacent, lesser quality habitats to create additional habitat connectivity.

Areas of habitat that are determined to be of moderate or lower quality will be enhanced through measures including construction of artificial burrows; planting and maintenance of native vegetation; control of exotic vegetation; maintenance of open patches of short vegetation; protection of burrowing rodents; and the elimination of onsite activities that could further degrade the quality of habitat, such as human recreational uses or grazing.

4.1.4 Mohave Ground Squirrel

Suitable habitat for MGS, including a diversity of shrub species, particularly drought-associated species, and suitable soils that provide substrate for burrow construction, will be identified, quantified, and mapped on the mitigation site. Onsite habitat that is of high quality will be protected and maintained.

Areas of habitat that are determined to be of moderate or lower quality will be enhanced through measures including control of exotic plant species and exotic predators; elimination of onsite activities that could further degrade the quality of habitat, such as human recreational uses; removal of any movement barriers that may exist; creation or enhancement of refugia habitat, including planting native vegetation; and removal of habitat degrading elements such as grazing hoofstock, feral dogs, and debris.

4.2 Resource Protection Measures

The purpose of the mitigation habitat will be to preserve wildlife and habitat resources; therefore, protection measures will be employed during restoration and enhancement activities to minimize impacts to existing sensitive habitats and wildlife species.

4.2.1 General Best Management Practices

1) Any areas that will be disturbed during restoration and enhancement activities, including staging areas, equipment access, and disposal or temporary placement of spoils, shall be delineated with stakes and flagging prior to the start of work to avoid natural resources where possible. No work-related activities will occur outside of the designated areas.

2) All construction materials, staging, storage, dispensing, fueling, and maintenance activities shall be located in upland areas outside of sensitive habitat, and adequate measures will be taken to prevent any potential runoff from entering jurisdictional waters.

3) No trash shall be left at the site. Trash and food items shall be removed daily to reduce the attractiveness to opportunistic predators such as common ravens, coyotes, and feral dogs that may prey on sensitive species.

4) Workers shall be prohibited from bringing pets and firearms to the site.

5) Best Management Practices (BMPs) shall be employed to prevent loss of habitat due to erosion caused by work-related disturbance (i.e., grading or clearing for new roads).

6) Fueling of equipment shall take place on existing paved roads and not within 300 feet of any waters of the U.S. Contractor equipment shall be checked for leaks prior to operation and repaired as necessary.

7) Wildfires shall be prevented by exercising care when driving and by not parking vehicles where catalytic converters could ignite dry vegetation. In times of high fire hazard (e.g., high wind or drought conditions), trucks may need to carry water and shovels or fire extinguishers in the field. No smoking or disposal of cigarette butts shall take place within vegetated areas.

4.2.2 Best Management Practices for General Wildlife

1) The Project proponent will designate a BLM-, USFWS- and CDFG-approved Designated Biologist(s). The contractors/construction crews involved in mitigation implementation shall be informed about the biological constraints of the mitigation activities. All construction personnel who work in the mitigation areas shall attend a contractor education program, developed and presented by a Designated Biologist prior to the commencement of work activity that has potential to disturb sensitive biological resources.

2) If any special-status wildlife are observed within the restoration work area, work crews must immediately cease work within 300 feet of the animal(s). The Designated Biologist must be immediately contacted to either relocate the animal or ensure that it has left the work area on its own.

3) The Designated Biologist shall be on site during any vegetation clearing and earth-disturbing activity. The Designated Biologist shall be on-call at all other times in case contractors/construction crews discover a special-status species within the work area.

4.2.3 Best Management Practices for Desert Tortoise

1) For any restoration work that requires ground disturbance with heavy equipment, the entire disturbance area shall be enclosed with a DT exclusionary fencing to keep DT in habitat adjacent to the site from entering the site during construction. The fencing type shall follow USFWS specifications, currently 1- by 2-inch vertical mesh galvanized fence material, extending at least 2 feet above the ground and buried at least 1 foot. Where burial is impossible, the mesh shall be bent at a right angle toward the outside of the fence and covered with dirt, rocks, or gravel to prevent the DT from digging under the fence. DT-proof gates shall be established at all site entry points. All fence construction shall be monitored by a Designated Biologist to verify that no DT are harmed. Following installation, the fencing shall be inspected monthly and during all major rainfall events. Damage to the

exclusionary fencing shall be temporarily repaired immediately and permanently repaired within 2 days of discovery.

2) A clearance survey for any DT that may be in the disturbance area shall be conducted in all areas with shrub cover following USFWS protocols. A minimum of two clearance passes shall be completed after DT-proof fencing is installed and these shall coincide with heightened DT activity, from late March through May and during September and October. This shall maximize the probability of finding all DT. Any DT found shall be moved by a Designated Biologist possessing a valid 10(a)(1)(A) permit to a location outside of the DT-proof fencing using techniques approved by Agency Representatives. Relocation shall only occur when daily ground temperatures do not exceed 107 °F (i.e., early spring or fall), so that DT can safely find refuge in potentially unfamiliar areas without the added constraints of lethal temperatures. No DT shall be moved between mid-April and early October, unless ambient temperatures are favorable. Once the site is deemed free of DT after two consecutive clearance passes, then heavy equipment shall be allowed to enter the sites to perform ground-disturbing activities.

3) All personnel shall utilize established roadways (paved or unpaved) in traveling to and from the mitigation area and also shall utilize existing tracks whenever possible. Cross-country vehicle and equipment use outside designated work areas shall be prohibited. To minimize the likelihood for vehicle strikes of DTs, a speed limit of 15 miles per hour shall be established for travel within the mitigation area and along off-highway access roads to the site.

4) Anytime a vehicle or construction equipment is parked in unfenced DT habitat, the ground under the vehicle shall be inspected for the presence of DT before the vehicle is moved. If a DT is observed, it shall be left to move on its own. If it does not move within 15 minutes, the Designated Biologist shall be contacted to remove and relocate the DT to a safe location.

4.2.4 Best Management Practices for Mohave Ground Squirrel

1) A preconstruction survey of the mitigation area shall be conducted no more than 30 days prior to restoration work activities to locate active MGS colonies. The survey shall consist of walking parallel transects and noting any sign of MGS (these may be combined with WBO and DT preconstruction surveys).

2) If during preconstruction surveys MGS are detected within an area that will be disturbed by restoration work activity, then every attempt will be made to avoid disturbance to the colony by modifying either the placement or the timing of restoration work activity.

4.2.5 Best Management Practices for Western Burrowing Owl

1) A preconstruction survey of the mitigation area shall be conducted no more than 30 days prior to restoration work activities to locate active WBO burrows and to estimate the current number of WBO individuals on site. The survey shall consist of walking parallel transects and noting any fresh WBO sign or presence of WBO (these may be combined with DT and MGS preconstruction surveys). Preconstruction surveys shall be conducted throughout the mitigation area.

2) If during preconstruction surveys WBO activity is detected at a burrow, then every attempt will be made to avoid disturbance to the burrow by modifying either the placement or the timing of restoration work activity. During the breeding season (February 1 through August 31), a 250-foot buffer shall be flagged surrounding the occupied burrow per CBOC guidelines and all work activity shall remain outside of the flagged area until a Designated Biologist determines the burrow is no longer occupied (e.g., juveniles are foraging independently and are capable of independent survival). During the nonbreeding season (September 1 through January 31), a 160-foot buffer shall be maintained per CBOC

guidelines. If restoration work activity cannot be moved or re-timed, then passive relocation techniques may be implemented with permission from CDFG as long as the WBO have not begun egg-laying, incubation, or have juveniles that are still dependent upon their parents and are incapable of independent survival.

4.2.6 Best Management Practices for Other Special-Status Species

1) If vegetation removal is scheduled to take place during the avian breeding season (roughly February through June for most species in the desert), a Designated Biologist shall conduct preconstruction surveys for nesting birds 30 days prior to vegetation clearance within a 300-foot buffer of (including areas outside the disturbance area) any vegetation removal areas.

2) If nesting birds, including but not limited to special-status species and those species protected by the Migratory Bird Treaty Act, are detected in these areas, the nest shall be flagged and no construction activity shall take place near the nest until nesting is complete (nestlings have fledged or nest has failed).

5.0 MONITORING PLAN

A well-designed, effectively executed monitoring plan is a powerful tool in the management of natural resources. A monitoring plan can help to determine the health of an ecosystem over time and whether a mitigation site is achieving the desired goals and success criteria. Monitoring provides an understanding of the ecological processes and will direct maintenance efforts to modify conditions as appropriate to create a self-sustaining ecosystem. A rigorously implemented plan is cost-effective because management problems can be identified in the early stages, before they become crises, when cost-effective solutions are still available. Regular monitoring helps identify successful management techniques and provides critical information for adapting or modifying the current management approach.

A monitoring plan will be developed to quantify and document establishment of vegetation and to determine when enhanced or restored habitat features will be self-sustaining. Quantitative and qualitative monitoring of mitigation areas may be conducted for 5 years following implementation of the mitigation, or when all success criteria have been met. An annual monitoring program may include 1) observation of existing and developing problems and recommendations for remedial actions; 2) an assessment of aquatic habitat and sensitive species habitat restoration/enhancement; 3) notation of invasive nonnative species and their control; 4) measurement of vegetation cover; 5) notation of wildlife species or sign observed; 6) assessment of overall habitat quality and extent for target species; and 6) photo documentation. A framework for the monitoring plan is provided below. However, more detailed maintenance and monitoring guidelines will be provided in the Conceptual HMP.

5.1 Performance Goals

The objective of an HMP is to restore and/or replace habitats and vegetation communities temporarily or permanently impacted by Project activities by establishing self-sustaining native vegetation without the need for significant maintenance efforts over the long term. Mitigation and monitoring goals may include:

1. Restoration and enhancement of native plants and vegetation communities and the associated breeding, foraging, and dispersal habitat for wildlife, with an emphasis on special-status species such as DT, WBO, and MGS, and sensitive natural and wetland communities.
2. Maintenance of healthy populations of common and special-status wildlife species through the implementation of adaptive management practices that enhance the conservation/mitigation area's ability to support those species.
3. Creation of physical conditions that will allow natural successional processes and native plant recruitment on the site, nutrient cycling, colonization of biological soil crusts, natural regeneration, plant succession, and wildlife movement.

4. Protection of special-status wildlife from impacts associated with nonnative and urban-adapted species.
5. Management of passive recreational uses in conservation/mitigation area(s) consistent with the goal of protecting and promoting their biological resource values.
6. Mitigation for loss of aquatic functions and values.
7. Mitigation for Project impacts to jurisdictional waters.
8. Preservation of and/or enhancement of habitat for DT, WBO, and MGS as mitigation for Project impacts.
9. Compliance with all regulatory permits and California Environmental Quality Act conditions.

5.2 Success Criteria

Success criteria are established to assess the progress of the mitigation and to verify the desired conditions are achieved. If attainment of success criteria is behind schedule, the Project proponent will implement remedial measures. Specific success criteria for the proposed mitigation will be included in the Conceptual HMP. For the mitigation of permanent impacts, onsite and reference site conditions will be examined with regard to native plant diversity and composition and wildlife habitat to develop the final success criteria for this component of the Project. Percent cover should be estimated from nearby reference areas (which the mitigation sites would be intended to eventually emulate). Existing cover and composition in the reference site will be determined and serve as a baseline for the final success criteria. In addition, a baseline California Rapid Assessment Method (CRAM) may be conducted for jurisdictional waters at the permanent impact site and mitigation sites to quantify the functions and values of the impacted system and the potential of the mitigation sites. CRAM methodology is being developed for desert wash systems and may be employed if available. CRAM values may also be used to set success criteria. Success criteria typically include criteria for native plant cover and habitat development, minimum invasive nonnative species cover, and a minimum CRAM score.

Success criteria may include:

- Successful preservation/enhancement of a minimum of 5,816.5 acres or acreage equivalent of habitat suitable for DT, which includes the following criteria:
    - Sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species;
    - Suitable substrates for burrowing, nesting, and overwintering;
    - Burrows, caliche caves, and other shelter sites; and
    - Sufficient vegetation for shelter from temperature extremes and predators.

- Successful preservation/enhancement of a minimum of 32.5 acres of suitable, occupied WBO habitat and successful establishment of at least 12 artificial burrows.

- Successful preservation/enhancement of a minimum of 7,078.2 acres or acreage equivalent (of habitat suitable for MGS, which includes the following criteria:
    - Sufficient quantity and quality of drought refugia with the forage species spiny hop-sage, winterfat, and saltbush;
    - Proper soil conditions to provide for burrowing opportunities; and
    - Preservation of migration corridors necessary for juvenile dispersal and movement between refugia.

- Successful preservation/enhancement of a minimum of 46.5 acres of jurisdictional waters. The definition of a successful jurisdictional waters mitigation effort will be that the area is dominated by wash-dependent species, with a clear indication that wetland hydrology is present.

- Habitat development and natural recruitment for the mitigation areas will be demonstrated by the end of the 5-year monitoring period. The goal of this criterion is to determine a trend in the establishment of self-sustaining native vegetation communities that support WBO, DT, and MGS, as well as waters. The percent cover of vegetation will be evaluated in the spring of years 1 through 5. The percent cover of native species will be at least 10 percent of the target percent cover (the target will be based on average cover of the mitigation and/or reference sites) by year 1, 40 percent of the target by year 3, and 90 percent of the target by year 5. Cover of invasive nonnative species will be maintained at less than 10 percent in year 1, less than 5 percent by year 3, and less than 2 percent by year 5. The extent and quality of suitable WBO, DT, and MGS habitats, and the presence of individuals/populations of the species will be evaluated annually.

- Remedial actions identified during the postconstruction monitoring period are followed, including but not limited to repair of fencing, seeding, planting, and erosion control, as applicable. The weed control methods, timing, and level of effort shall be adjusted as necessary to reduce nonnative cover below threshold. The annual report will confirm that remedial actions were followed.

Because of the ephemeral and unpredictable nature of desert environments, native plant recruitment and establishment rates can be highly variable. If after 5 years the desired cover and habitat development are not attained, additional monitoring may be required until the criteria are met. Additionally, if the habitat maintenance and enhancement goals for DT, WBO, and MGS do not meet the target, additional monitoring and habitat enhancement as detailed in Section 7.2, may be necessary. Once the final success criteria have been met, maintenance, monitoring, and reporting will be discontinued. If the regulatory agencies concur that final success criteria have been met ahead of schedule, then the maintenance and monitoring program may be discontinued prior to 5 years.

5.3 Monitoring Methods

A qualified restoration ecologist will perform monitoring in the mitigation area for a minimum of 5 years after installation. The restoration ecologist will inspect the mitigation site a minimum of twice a year. Monitoring will focus on percent cover of native species, natural recruitment of native plants, habitat development, and the presence of any invasive nonnative species on site. In addition, any other issues or areas of concern such as erosion, fencing, or trash will also be documented during monitoring. The restoration ecologist will coordinate with the maintenance contractor to exchange information, provide feedback, and agree on priority maintenance items focused on weed control and erosion control.

Habitat assessments and surveys specific to DT, WBO, and MGS will be conducted by a qualified wildlife biologist for the mitigation area. A minimum of two annual visits at times of increased activity will be conducted.

Monitoring methods, specifically sampling techniques, should be designed and conducted by a qualified biologist. If a large area of planting is undertaken, representative plots that will result in statistically representative sampling may be used to reduce monitoring efforts. Methodology should remain uniform throughout the study to avoid inconsistencies that could jeopardize the usefulness of the analysis.

Monitoring methods will include those components listed in the sections below.

5.3.1 Site Inspection

Site monitoring is necessary to evaluate plant health, as well as successful wildlife recruitment and site use, and to identify and correct problem areas. A qualified biologist will visit the mitigation site throughout the 5-year establishment and monitoring period to evaluate growth and vigor of the vegetation, the recruitment of native species, the extent of suitable DT, WBO, and MGS habitats, and use of onsite habitats by these species; evaluate habitat quality; and assess any problems on site. The qualified biologist will walk the site and document any problems requiring corrective action and will provide specific

recommendations regarding biological and mechanical erosion control, debris removal, nonnative plant control, irrigation prescriptions, reseeding, planting, species cultural requirements and treatments, pest control, fencing, and the need for and/or removal of browse cages.

5.3.2 Photodocumentation

Permanent photo locations will be established during baseline monitoring and each point numbered with a unique identifier. Locations will be recorded on the as-built plans. Photo monitoring will be conducted at the same time of year or during the same growth stage (i.e., in full leaf) each year. The photos can be compared to qualitatively assess changes in general site conditions as well as vegetative composition, cover, dominance, and structure. The use of remote camera stations may be useful to document wildlife use of habitats.

5.3.3 Habitat Monitoring

If native plants and habitat establish in the mitigation area, the restoration ecologist will document this establishment by mapping the habitat polygons on an aerial-based map and/or the scattered native plant cover percentage will be estimated to determine the overall native habitat area. Percent cover of native species in the revegetated areas will be estimated quantitatively using the quadrat method, line-intercept method, or another appropriate percent cover method. Additionally drought vegetation, burrow and other wildlife refugia habitats established or enhanced should be evaluated and mapped using appropriate quantitative methods.

5.3.4 California Rapid Assessment Method (CRAM)

An assessment of wetland condition may be conducted using CRAM, if an applicable desert wash module is available prior to mitigation implementation, during the year 1 monitoring event and then again in year 3 and year 5. The overall goal of CRAM is to "provide rapid, scientifically defensible, standardized, cost-effective assessments of the status and trends in the condition of wetlands and related policies, programs and projects throughout California" (Collins et al. 2007). CRAM is designed to assess a restoration site's progress toward meeting success criteria. If a suitable desert wash methodology is available, CRAM may be used for monitoring the progress of the restoration site toward meeting specific habitat, wildlife, and water quality success criteria, as well as to direct adaptive management strategies throughout the life of the monitoring program.

5.3.5 Desert Tortoise Monitoring

A baseline assessment of the mitigation area consisting of walking and driving throughout the mitigation area, should be conducted to identify and systematically select 10-meter transect placement for annual monitoring based upon quality of habitat, availability of refugia, and known DT occurrences. An adequate number of transects should be selected to allow for an overall snapshot of the mitigation site to be monitored annually. Areas where specific enhancement activities have been undertaken should be represented within these transects as well as at least one unaltered transect for comparison. Surveys should be conducted in spring (April 1 through May 30) or fall (September 1 through October 31) on days when the ambient temperature remains below 104°F, and should follow guidelines established in *Preparing for Any Action That May Occur Within the Range of the Mojave Desert Tortoise* (*Gopherus agassizzii*) (USFWS 2009a). On days when temperatures are anticipated to be above 95°F, surveys should be conducted closer to dawn and dusk hours.

All DT and sign of DT activity should be noted. Photographs of DT observations, large carcasses, and/or unusual sign should be taken when possible (i.e., animal not deep in burrow). Burrows, scat, and shell remains should be classed using the *Information Index for Desert Tortoise Sign: Burrows and Dens, Scats and Shell Remains as in the USFWS Field Survey Protocol for any Non-Federal Action That May Occur within the Range of the Desert Tortoise* (protocol) (USFWS 1992). Any problems identified during survey efforts should be addresses within the adaptive management plan.

5.3.6 Western Burrowing Owl Monitoring

A baseline survey of the mitigation area for burrows and burrowing owls should be conducted by walking and driving the entire area. Surveyors should keep a distance of approximately 160 feet from burrowing owls and active burrows should they be detected. Active burrows, secondary sign, and burrowing owls identified on site should be photographed and mapped. Additionally, areas of specific enhancement efforts should be noted on the map, so that the efficacy of such efforts can be monitored.
Active burrows that are identified during the baseline survey should be monitored twice a year, once during overwintering period (December 1 through January 31) and once during breeding season (April 15 through July 15), by walking and driving while visually scanning the areas mapped during the baseline survey. Active burrows, secondary sign, and burrowing owls identified on site during these surveys should be photographed and mapped. Surveys should not be conducted when visibility is poor and when burrowing owls are unlikely to be seen outside their burrow such as heavy rain, high winds (> 20 miles per hour), or dense fog.

5.3.7 Mohave Ground Squirrel Monitoring

A baseline survey of the mitigation area for burrows, drought-specific vegetation, and other appropriate refugia for MGS should be conducted by walking and driving (where appropriate) the entire area. All MGS, drought refugia, and burrows should be photographed and mapped. Additionally, areas of specific enhancement should be noted, so that the efficacy of such efforts can be monitored.

Visual surveys for MGS should be conducted a minimum of once per year between March 15 and April 15, during the day when ambient temperatures are below 95°F. If feasible, trapping methods as outlined in the CDFG guidance (CDFG 2003a) for biologists holding Memorandums of Understanding, or alternative sampling methods such as track stations or camera stations may be employed in areas of high-quality habitat.

5.4 Schedule

A specific monitoring schedule will be determined upon the completion of mitigation designs and provided in the Conceptual HMP. Table 5 shows the framework for a schedule of monitoring.

TABLE 5. MONITORING SCHEDULE FOR MITIGATION AREAS

Monitoring Type	Timing
As-Built Plans	30 days following completion of grading
Photodocumentation	To be determined
Site Inspection	To be determined
Habitat Monitoring	To be determined
CRAM Years 1, 3, and 5	To be determined

6.0 MONITORING REPORTS

6.1 As-Built Plans

While many of the enhancement methods outlined in this HMP do not require significant landscape modifications, some measures including recruitment of dune soils, recontouring of washes to maximize recruitment of native vegetation, or creation of refugia for species may require some surface modification. If surface modification is required as part of the enhancement activities, as-built topographic plans for each mitigation area will be made within 30 days following completion of enhancement activities. During

the first monitoring visit, permanent photo points will be established, marked in the field, and mapped on the as-built plans. Upon completion of the as-built plans, a letter will be sent to the permitting agencies notifying them of the completion of the mitigation work and the start of the monitoring period. If grading or other earthwork is not necessary to maintain or enhance habitats on the mitigation site, as-built plans will not be created.

6.2 Annual Reporting

Annual monitoring reports will be submitted each year to the permitting agencies as required. The first year's report will summarize the baseline information as well as the first year monitoring results. Thereafter, annual reports will consist of a summary of information contained in previous reports, as well as a presentation of the current year's results and discussion of any comparisons between years or trends noted. Annual reports will include a summary of monitoring methods, including data collection and analysis, analysis of success in relation to the success criteria, color photographs of the mitigation area taken at established photo points, and a discussion of any corrective actions needed or undertaken (including invasive species control efforts or reseeding/planting).

7.0 POTENTIAL CONTINGENCY MEASURES

In the event that restored areas do not meet success criteria as outlined in this document, contingency measures will need to be implemented to maintain regulatory compliance. Contingency measures may include onsite remediation of restored areas and providing additional restoration as mitigation as directed by the regulatory agencies.

Onsite remediation would occur if anticipated plant survival maintenance and enhancement of suitable habitats for DT, WBO, and MGS and other success criteria were not met during any point in the monitoring period as described in this document. Remedial actions can also include reseeding or planting of restored habitats if it is determined that the vegetation component does not meet and is unlikely to meet the vegetation component described in the regulatory permits and environmental documents prepared for the Project.

The removal and/or eradication of invasive nonnative vegetation from the mitigation site may be needed as an onsite remediation measure. The control of undesirable species would serve to improve habitat quality within all habitats, including habitat for special-status wildlife species.

7.1 Initiating Procedures

Should the proposed restoration efforts not meet the success criteria stated in the Final HMP, a request to conduct additional remedial work (e.g., grading, soil addition, or seeding) will be submitted to the regulatory agencies for review. Before contingency measures are undertaken, the cause of substandard site function will be identified and appropriate corrective actions will be taken. This may result in the resolution of the improperly functioning component and successful site functioning.

7.2 Adaptive Management

The mitigation Project should utilize an adaptive management approach, which allows resource management practices to adjust to unanticipated circumstances. Adaptive management in conjunction with continued monitoring, consultation with experts, and record keeping is important to restoration success. The primary reason for using adaptive management is to allow for changes in the strategies that may be necessary to reach the goals of the mitigation, and to ensure the likelihood of the survival of target species. Under adaptive management, activities and ecosystems are monitored and analyzed to determine how they function ecologically and if they are producing the desired results. If the desired results are not being achieved, adjustments in the management strategy must then be considered. Monitoring, as described above, is an integral and essential tool in any successful adaptive management

approach. Sampling and analyses should be designed in such a way as to ensure that data will be efficiently and properly collected, analyzed, archived, and used, to allow for adjustment of management strategies as needed or indicated by the monitoring findings.

8.0 COMPLETION OF MITIGATION RESPONSIBILITIES

Once final success criteria have been met, a notification will be included with the year 5 monitoring report that the monitoring period has been completed. Long-term management activities will continue to maintain the preserved and enhanced mitigation site for the target resources in perpetuity. If agency staff request a site visit to confirm completion of the mitigation effort, access will be provided.

9.0 LONG-TERM MANAGEMENT

9.1 Conservation Easement

A conservation easement would be established for private lands acquired for compensatory mitigation purposes such that lands would be preserved in perpetuity. Because a conservation easement would be used as the vehicle for resource protection, the fee title holder can be either the original land owner, the Project Applicant, or an approved third-party entity such as DTPC, Wildlands, Inc., The Nature Conservancy, CDFG, or other land conservancy. In the case of the RSPP, a third-party entity would be preferred. The Project owner shall transfer fee title or a conservation easement on compensation lands either to CDFG under terms approved by CDFG, or alternatively, to a Compliance Project Manager-approved, in consultation with CDFG and USFWS, nonprofit organization qualified pursuant to California Government Code section 65965 (e.g., DTPC, Inc.; Wildlands, Inc., The Nature Conservancy, etc.). In the event an approved nonprofit holds title, a conservation easement shall be recorded in favor of CDFG in a form approved by CDFG; in the event an approved nonprofit holds a conservation easement over the compensation lands, CDFG shall be named a third-party beneficiary. The preferred approach is for a qualified nonprofit to hold the conservation easement.

9.2 Management Plan

A long-term management plan will be prepared for the mitigation site and provided for agency review and approval after a mitigation site has been selected and potential long-term preserve manager options are determined. The plan will become an addendum to the Final HMP. This plan will detail monitoring and maintenance to be implemented in perpetuity after the initial 5-year monitoring period has been completed.

9.3 Predator Control

A management plan for the control of predators, especially ravens, is currently in development for the Project and will be adapted for the mitigation areas. Predators may be removed or reduced, but new predators can reestablish in an area. Thus, predator control is a long-term and continuous investment.

9.4 Fencing and Signage

Fencing may or may not be appropriate depending on the conditions at the chosen mitigation site. Any fencing installed must not inhibit wildlife movement and must be designed such that it will not entangle or entrap wildlife species such as DT. Fencing may be appropriate to restrict road access and prevent unauthorized use of OHVs and other vehicles. Signage will be installed to inform the public of restricted site access.

9.5 Managers

An appropriate land management entity will be proposed for approval by the CEC, CDFG, and USFWS. The land management entity will likely hold the endowment to streamline management of the funds.

9.6 Responsibility and Funding

The Applicant will be responsible for funding and implementing all habitat enhancements and associated 5-year monitoring described in this HMP for offsite mitigation lands acquired and preserved. Fee-based mitigation funds will be earmarked for specific enhancement, management activities, or studies to be carried out by organizations and according to plans approved by the CEC, CDFG, and USFWS.

Long-term management, monitoring, and reporting obligations associated with the overall mitigation site conservation easement area will be provided under separate cover**.** These obligations will be the responsibility of the approved conservation easement holder (a third party approved by USFWS), pursuant to the terms of the conservation easement. Funding to implement long-term management and monitoring will be accomplished through the establishment of an endowment, funded by the Applicant.

The endowment amount will be reviewed and approved by the identified land management entity and resource agencies. The amount of the permanent capital endowment will be determined through the PAR or PAR-like analysis. Interest from this amount will be available for reinvestment into the principal and for the long-term operation, management, and protection of the mitigation lands, including reasonable administrative overhead, biological monitoring, law enforcement measures, and any other action designed to protect or improve the habitat values of the mitigation land.

10.0 REFERENCES

AECOM. 2009a. Ridgecrest Solar Power Project Application for Certification, Volume 1. Prepared for Solar Millennium, LLC. September 1.

AECOM. 2009b. Ridgecrest Solar Power Project Jurisdictional Delineation Report for Regulated Waters of the United States and State, Kern County, California. Prepared for Solar Millennium, LLC. November.

AECOM. 2009c. Ridgecrest Solar Power Project Supplemental Biological Resources Survey Report Kern County, California. Prepared for Solar Millennium, LLC. November.

AECOM 2009d. Ridgecrest Solar Power Project Desert Tortoise Technical Report, Kern County, California. Revised for Solar Millennium, LLC. December.

Allen, A. O. 1999. Urbanization and Dryland Fluvial Systems – Modeling Hydrogeomorphic Change in Ephemeral Streams. Ph.D. dissertation. University of California, Los Angeles, pp. 1–240.

Andersen, M. C., J. M. Watts, J. E. Freilich, S. R. Yool, G. I. Wakefield, J. F. McCauley, and P. B. Fahnestock. 2000. Regression-Tree Modeling of Desert Tortoise Habitat in the Central Mojave Desert. Ecological Applications, 10, 890–200.

California Burrowing Owl Consortium (CBOC). 1993. Burrowing Owl Survey Protocol and Mitigation Guidelines. April 1993.

California Department of Fish and Game (CDFG). 2003a. California Department of Fish and Game Mohave Ground Squirrel Survey Guidelines. 5 pp. (Unpublished).

California Department of Fish and Game (CDFG). 2003b. California Department of Fish and Game Wildlife Habitat Data Analysis Branch. The Vegetation Classification and Mapping Program- List

of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database. Available at http://www.dfg.ca.gov/whdab/pdfs/natcomlist.pdf. September.

California Invasive Pest Council (Cal-IPC). 2007. The CAL-IPC List of Exotic Pest Plants of Greatest Ecological Concern in California.

Campbell, K. F. 2004. Burrowing Owl – Species Account. Final Environmental Impact Report and Statement for the West Mojave Plan. U.S. Dept. of Interior, Bureau of Land Management. Moreno Valley, California. December 2004.

Collins, C. T., and R. E. Landry. 1977. Artificial nest burrows for burrowing owls. North American BirdBander 2:151–154.

Collins, J. N., E. D. Stein, M. Sutula, R. Clark, A. E. Fetscher, L. Grenier, C. Grosso, and A. Wiskind. 2007. California Rapid Assessment Method (CRAM) for Wetlands, Riverine Hand Book v.5.0.1. 151 pp.

Center for Biological Diversity, Santa Clara Valley Audubon Society, Defenders of Wildlife, San Bernardino Valley Audubon Society, California State Park Rangers Association and Tri-County Conservation League. 2003. Petition to the State of California Fish and Game Commission and Supporting Information for Listing the California Population of the Western Burrowing Owl (*Athene cunicularia hypugaea*) as an Endangered or Threatened Species under the California Endangered Species Act. Submitted April 7.

DeSante, D. F., E. D. Ruhlen and D. K. Rosenberg. 1996. The Distribution and Relative Abundance of Burrowing Owls in California: Evidence for a Declining Population. Institute for Bird Populations. Point Reyes Station, California.

EDAW AECOM. 2009. Ridgecrest Solar Power Project Biological Resources Technical Report Kern County, California. Prepared for Solar Millennium, LLC. September.

Garrett, K., and J. Dunn. 1981. Birds of Southern California. Status and Distribution. Los Angeles Audubon Society.

Haug, E. A., B. A. Millsap, and M. S. Martell. 1993. Burrowing Owl (*Athene cunicularia*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/061.

Holland, R. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. Nongame Heritage Program, State of California Department of Fish and Game.

Karl, A. E. 2002. Desert Tortoise Abundance in the Fort Irwin National Training Center Expansion Area: Second-Year Studies. 45 pp. plus appendices.

Klute, D. S., L. W. Ayers, M. T. Green, W. H. Howe, S. L. Jones, J. A. Shaffer, S. R. Sheffield, and T. S. Zimmerman. 2003. Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States. U.S. Department of Interior, Fish and Wildlife Service, Biological Technical Publication FWS/BTP-R6001-2003, Washington, D.C.

Leitner, P. 2008. Current Status of the Mohave Ground Squirrel. Transactions of the Western Section of The Wildlife Society 44:11–29.

Leitner, P. 2009. Mohave Ground Squirrel Habitat Assessment: Solar Millennium Ridgecrest Solar Power Project. Project Technical Report. August.

Leitner, P., and B. M. Leitner. 1998. Coso Grazing Exclosure Monitoring Study, Mohave Ground Squirrel Study Coso Known Geothermal Resource Area, Major Findings 1988–1996. Final Report.

Lichvar, R., W. Brostoff, and S. Sprecher. 2006. Surficial features associated with pond water on playas of the Arid Southwestern United States: Indicators for delineated regulated areas under the Clean Water Act. *Wetlands* 26: 385–399.

Mohave Ground Squirrel Working Group (MGSWG). 2006. Draft Mohave Ground Squirrel Conservation Strategy. Report prepared by the Desert Management Group. August. Available at http://www.dmg.gov/documents/DFT_MGS_Consv_Strategy_DMG_082906.pdf.

National Oceanic and Atmospheric Administration (NOAA). 2009. Record of River and Climatological Observations, Desert Center 2NNE. Original station data forms for February, March, April, and May 2009.

Natural Resource Conservation Service (NRCS). 2009. National List of Hydric Soils. Available at http://soils.usda.gov/use/hydric/.

Nussear, K. E., T. C. Esque, R. D. Inman, Leila Gass, K. A. Thomas, C.S.A. Wallace, J. B. Blainey, D. M. Miller, and R.H. Webb. 2009. Modeling Habitat of the Desert Tortoise (*Gopherus agassizii*) in the Mojave and Parts of the Sonoran Deserts of California, Nevada, Utah, and Arizona: U.S. Geological Survey Open-File Report 2009-1102, 18 p.

Sawyer, J. O., and T. Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant Society, Sacramento, California.

Stewart, Glen R. 2005. Petition to list the Mohave Ground Squirrel (*Spermophilus mohavensis*) as a Federally Endangered Species. Defenders of Wildlife, Sacramento, California.

Trulio, L. A. 1994. The Ecology of a Population of Burrowing Owls at a Naval Air Station in Northern California. Dept. of the Navy. San Bruno, California.

U.S. Army Corps of Engineers (USACE). 2007. Review and Synopsis of Natural and Human Controls on Fluvial Channel Processes in the Arid West. September.

U.S. Army Corps of Engineers (USACE). 2008. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual ERDC/CRREL TR-08-12.

U.S. Bureau of Land Management (BLM). 2005. West Mojave Plan, A Habitat Conservation Plan and California Desert Conservation Area Plan Amendment, Final Environmental Impact Report and Statement. California Desert District Office, Moreno Valley, CA. Available online at http://www.blm.gov/ca/pdfs/cdd_pdfs/wemo_pdfs/plan/wemo/.

U.S. Fish and Wildlife Service (USFWS). 1992. *Information Index for Desert Tortoise Sign: Burrows and Dens, Scats and Shell Remains as in the USFWS Field Survey Protocol for any Non-Federal Action That May Occur within the Range of the Desert Tortoise*.

U.S. Fish and Wildlife Service (USFWS). 1994a. Federal Register: Endangered and Threatened Wildlife and Plants; Determination of Critical Habitat for the Mojave Population of the Desert Tortoise; Final Rule. FR Doc. 94-2694. 50 CFR. Part 17. Vol. 59. No. 26: pp. 5820–5866. February 8, 1994. Available at http://ecos.fws.gov/docs/federal_register/fr2519.pdf.

U.S. Fish and Wildlife Service (USFWS). 1994b. The Desert Tortoise (Mojave Population) Recovery Plan. U.S. Fish and Wildlife Service, Region 1 – Lead Region, Portland, Oregon. 73 pp. + appendices.

U.S. Fish and Wildlife Service (USFWS). 2008. Draft Revised Recovery Plan for the Mojave Population of the Desert Tortoise (*Gopherus agassizi*). U.S. Fish and Wildlife Service, California and Nevada Region, Sacramento, California. 209 pp. available at http://ecos.fws.gov/docs/recovery_plan/080804.pdf.

U.S. Fish and Wildlife Service (USFWS). 2009a. Preparing for Any Action That May Occur within the Range of the Mojave Desert Tortoise (*Gopherus agassizii*).

U.S. Fish and Wildlife Service (USFWS).2009b. Range-wide Monitoring of the Mojave Population of the Desert Tortoise: 2007 Annual Report. Desert Tortoise Recovery Office, Reno, Nevada.

U.C. Davis. 2009. California Soil Resource Lab. Available at http://casoilresource.lawr.ucdavis.edu/drupal/. Accessed April.

Weinstein, M. N. 1989. Modeling Desert Tortoise Habitat: Can a Useful Management Tool Be Developed from Existing Transect Data? Los Angeles, University of California, unpublished Ph.D. dissertation, 121 pp.

Zarn, M. 1974. Burrowing Owl. U.S. Department of Interior, Bureau of Land Management. Technical Note T-N 250. Denver, Colorado. 25 pp.

Ridgecrest Solar Power Project Habitat Mitigation and Monitoring Plan

Figure 1
Project Vicinity

Source: ESRI; AECOM 2009

Solar Millennium

AECOM

Date: February 2010

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Brown Road

Map Location

Legend

- Biological Resources Survey Area (BRSA)
- ROW
- Project Disturbance Area
- Facility Footprint

Proposed Project Elements

- Facility Footprint
- Drainage Channel
- Transmission Line
- Power Block Area
- Solar Unit
- Switchyard
- Water Line
- Perimeter Security Fence

Source: NAIP 2005; AECOM 2009; EDAW 2009

[1]Note: Based on the reconfigured Project Design as of January 2010

N
W
E
S

1 inch = 3,500 feet

0 3,500 7,000 Feet

Ridgecrest Solar Power Project
Habitat Mitigation
and Monitoring Plan

Figure 2
Proposed Project Elements and Project Area

Solar Millennium

AECOM

Date: February 2010

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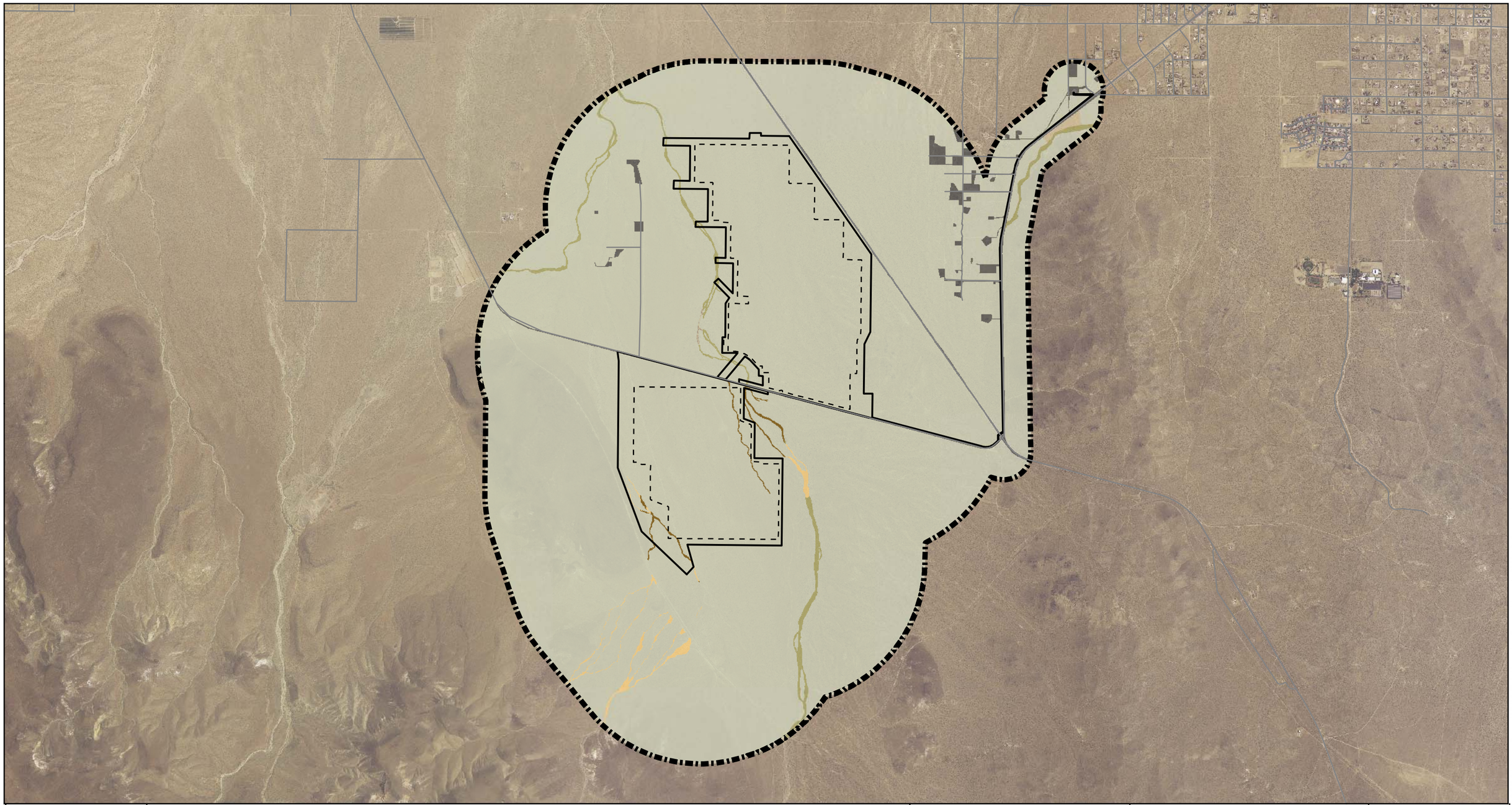

Map Location

Legend

- Biological Resources Survey Area (BRSA)
- Facility Footprint
- Project Disturbance Area
- Paved Roads

Vegetation Communities

Riparian

- Mojave Desert Wash Scrub
- Unvegetated Ephemeral Dry Wash
- Unvegetated Ephemeral Dry Wash (Presumed)[1]

Upland

- Mojave Creosote Bush Scrub
- Disturbed Habitat

Other

- Developed

[1] NOTE: Due to minimum mapping unit within buffer (1.0 mile), these areas are presumed to be unvegetated

Source: NAIP 2005; CNDDB 2009; AECOM 2009; EDAW 2009

N W E S

1 inch = 3,500 feet

0 3,500 7,000 Feet

Ridgecrest Solar Power Project
Habitat Mitigation and Monitoring Plan

Figure 3
Vegetation Communities within the Project Area

Solar Millennium

AECOM

Date: February 2010

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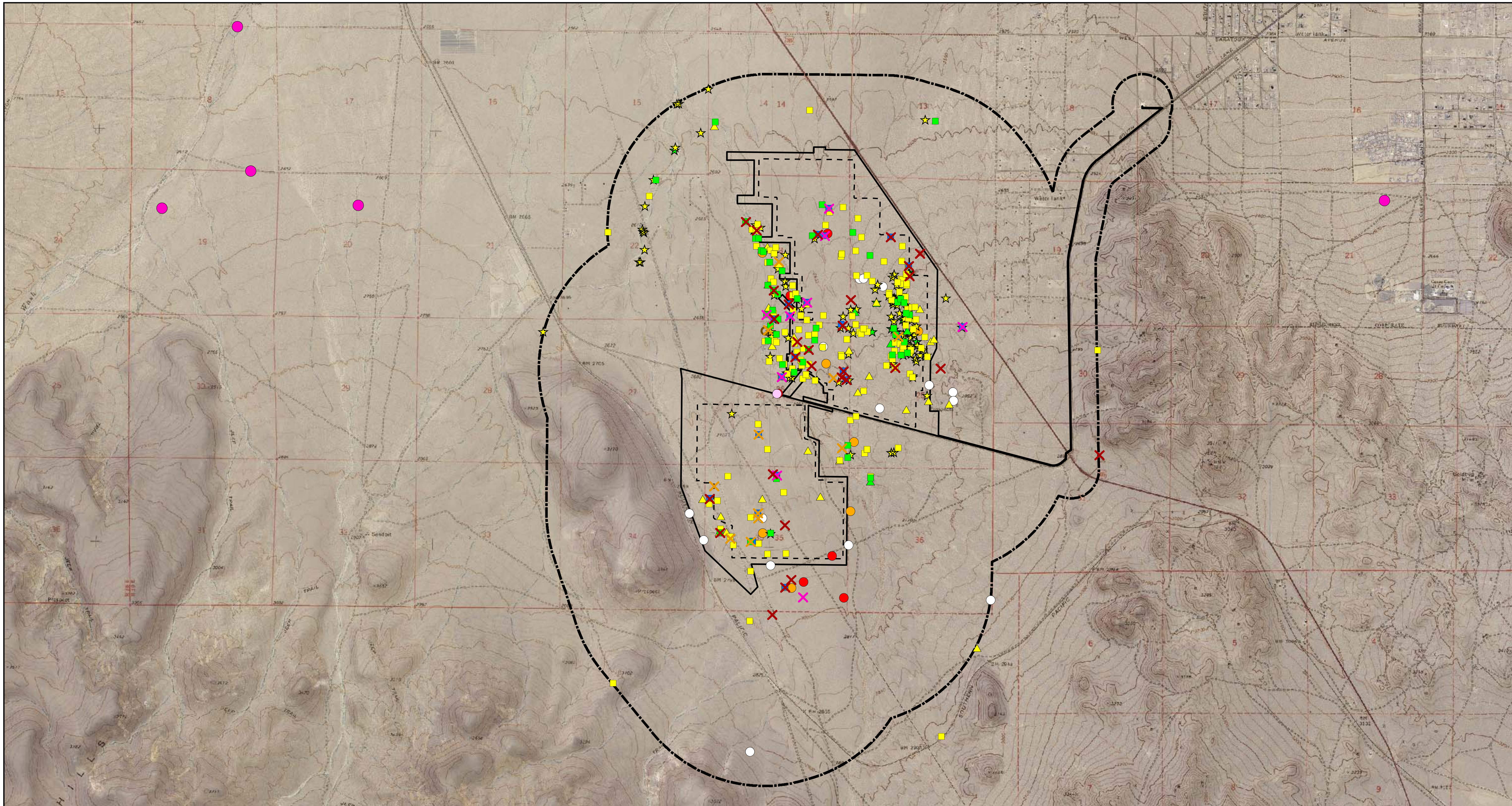

Map Location

Legend

- Biological Resources Survey Area (BRSA)
- Project Disturbance Area
- Facility Footprint

Desert Tortoise Observations

- Adult Tortoise
- Juvenile Tortoise
- Tortoise (Unknown Age)
- Tortoise Burrow - Active
- Tortoise Burrow - Occupied
- Tortoise Burrow
- Tortoise Pallet
- Tortoise Pallet - Active
- Tortoise Scat
- Tortoise Scat - Fresh
- Tortoise Tracks
- Tortoise Bone Fragments
- Tortoise Carcass - Adult
- Tortoise Carcass - Juvenile
- Juvenile Tortoise - Vehicle Collision

CNDDB Records

- Desert Tortoise

Source: NAIP 2005; AECOM 2009

N W E S

1 inch = 3,500 feet

0 3,500 7,000 Feet

Ridgecrest Solar Power Project Habitat Mitigation and Monitoring Plan

Figure 4
Recorded Occurrences of Desert Tortoise near the Project Area

Solar Millennium

AECOM

Date: February 2010

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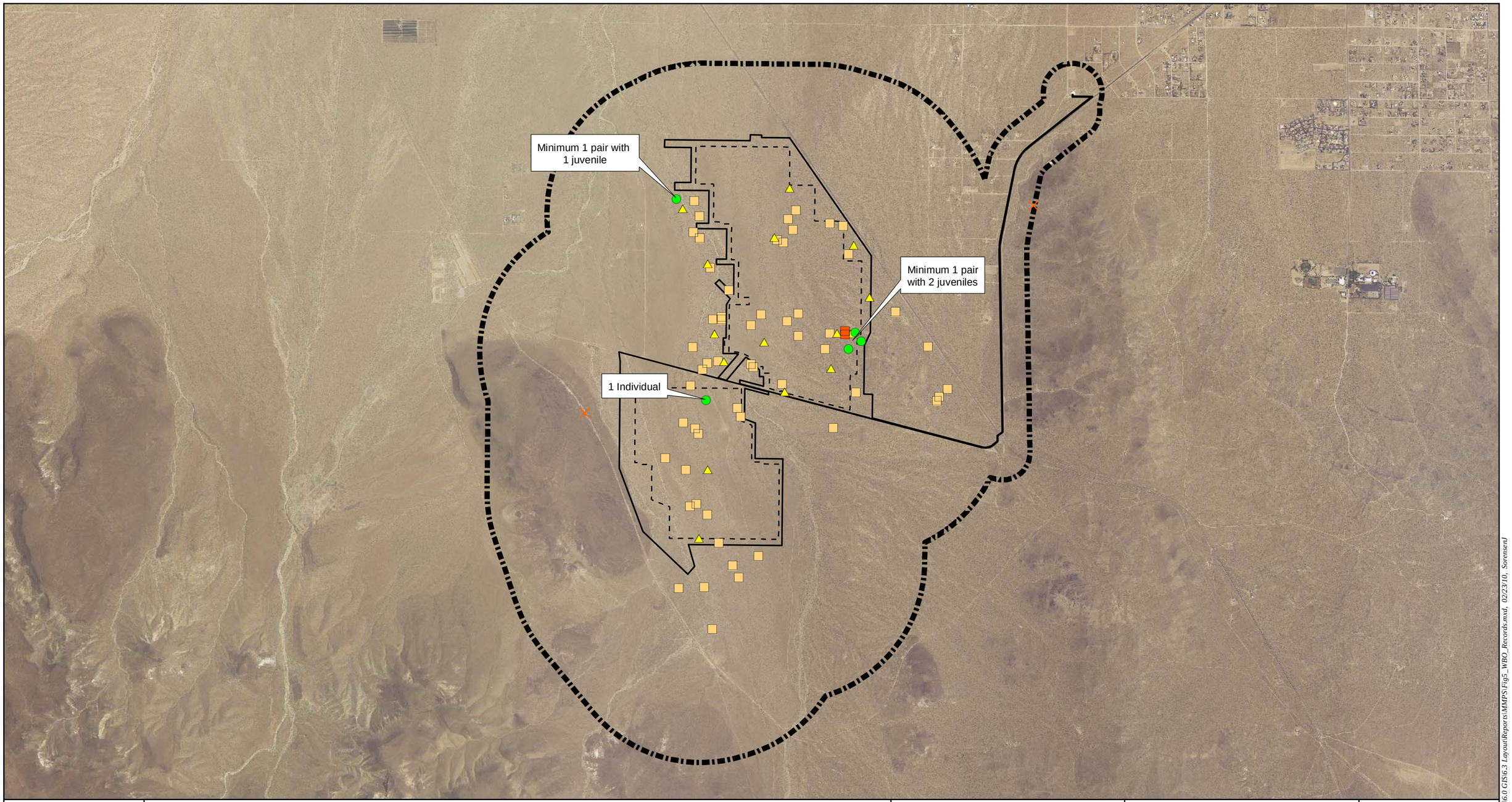

Map Location

Legend

- Biological Resources Survey Area (BRSA)
- Project Disturbance Area
- Facility Footprint

Burrowing Owl Observations

- Burrowing Owl
- Active Burrow (Main)
- Active Burrow (Satellite)
- Burrow with Abundant Sign
- Burrow with Sign

Source: NAIP 2005; AECOM 2009; EDAW 2009

N W E S

1 inch = 3,500 feet

0 3,500 7,000 Feet

Ridgecrest Solar Power Project
Habitat Mitigation
and Monitoring Plan

Figure 5
Recorded Occurrences of
Western Burrowing Owl

Solar Millennium

AECOM

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Brown Road

Impacts to Mohave Ground Squirrel Habitat					
Species		Total Impact (acres)	Low Quality Habitat (acres)	Moderate Quality Habitat (acres)	High Quality Habitat (acres)
Mohave Ground Squirrel	North of Brown Rd (outside conservation area)	1127.9	139.5	957.2	31.2
	South of Brown Rd (within conservation area)	794.6	284.1	439.1	71.4
Total Impact (acres)		1922.6	423.6	1396.4	102.6

Map Location

Legend

- ROW
- Disturbance Area

Proposed Project Elements

- Solar Loops
- Drainage Channel
- Transmission Line
- Power Block
- Switchyard

Source: NAIP 2005; AECOM 2010

Habitat Quality

Mohave Ground Squirrel

- High - Desert Washes and Adjacent High Diversity Creosote Bush
- Medium - Low Diversity Creosote Bush
- Low - Monotypic Creosote Bush
- Unsuitable - Rocky Terrain

N W E S

1 inch = 2,500 feet

0 2,500 5,000 Feet

Ridgecrest Solar Power Project
Habitat Mitigation and Monitoring Plan

Figure 6
Mohave Ground Squirrel Habitat within the Project Area and Impacts

Solar Millennium

AECOM

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Tulare
Kern
Inyo
San Bernardino
395
5
15

Map Location

Legend

- Ridgecrest Solar Power Plant
- Desert Tortoise Range (DFG)
- Desert Wildlife Management Area
- Tortoise Critical Habitat
- Mohave Ground Squirrel Range (BLM)
- Mohave Ground Squirrel Conservation Area (BLM)

Land Management Data (BLM)

- Bureau of Land Management
- Other Federal Agencies
- Local Government
- Military
- State
- Unclassified/Private (shown as open aerial)

Source: NAIP 2005; AECOM 2010

N
W E
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1 inch = 10 miles

0 10 20 Miles

Ridgecrest Solar Power Project
Habitat Mitigation
and Monitoring Plan

Figure 7
Regional Map of Conservation Priorities and Potential Offsite Mitigation Opportunities

Solar Millennium

AECOM

Date: February 2010

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