Introduction

To address concerns expressed by the resource agencies, the Ridgecrest Solar Power Project (RSPP or Project) site plan has been reconfigured to minimize Project impacts to the El Paso Wash. South of Brown Road, this will be accomplished by shifting the south solar field slightly to the north and west, placing it entirely to the west of the wash. North of Brown Road, the north solar field has been shifted north and east to move the field entirely out of the wash. As a result of the site reconfiguration, impacts to the El Paso Wash will be largely avoided, with the exceptions of the road culvert crossing at Brown Road, the heat transfer fluid (HTF) pipe bridge, the new 230-kilovolt (kV) transmission line, and 8 to 10 drainage channel tie-ins. These drainage tie-ins are proposed to aid in maintaining natural flow diverted from swale complexes within the Project footprint that would be impacted by construction activities for the RSPP. Further details regarding the impacts associated with the reconfigured site plan, including construction of crossings and tie-ins, are being developed and will be provided in February. To further minimize impacts on sensitive biological resources, a natural vegetated buffer around the El Paso Wash is being incorporated into the site plan. Natural flow would not be effectively diverted away from the El Paso Wash, and impacts to the natural communities supported by the wash would be substantially reduced when compared to the original site plan. The reconfigured site plan (Figure DR-ALT-39) would retain the wash's hydrologic and ecological functions and allow for the continued use of the El Paso Wash as a wildlife movement corridor.

New surveys to address changes to the Project footprint as a result of the site plan reconfiguration have yet to be conducted. Protocol surveys of the 3.6 miles of water pipeline and approximately 200 acres of disturbance area resulting from solar field redesign not yet subject to focused studies will be conducted during the appropriate seasonal windows in spring 2010. Surveys of any proposed translocation or compensatory mitigation sites would also be required. The following table summarizes surveys that would be required by resource area and the optimal timeframes (i.e., survey windows) for surveys.

Resource	Surveys to be completed	Survey window
Desert tortoise	• Protocol survey of newly proposed areas within the revised project disturbance area (not overlapping with previous survey areas) and associated CEC buffer transects • Protocol survey of proposed translocation site(s) and habitat compensation site(s)	March 25 to May 31, 2010 (one survey visit at 100 percent coverage)
Western burrowing owl	• Protocol survey of newly proposed areas within the revised project disturbance area (not overlapping with previous survey areas) • Protocol survey of proposed translocation site(s) • Habitat suitability justification (e.g., habitat assessment) of habitat compensation site(s)	April 15 to July 15, 2010 (minimum 4 survey visits)
Mohave ground squirrel	• Habitat suitability assessment/mapping of newly proposed areas within the revised project disturbance area (not overlapping with previous survey areas) • Habitat suitability assessment/mapping of translocation site(s) and compensation site(s)	No survey timing restrictions
Vegetation Communities	• Vegetation mapping within newly proposed areas within the revised project disturbance area or 1-mile CEC buffer	No survey timing restrictions
Flora	• Focused botanical surveys within newly proposed areas of the revised project disturbance area or 1-mile CEC buffer that contain suitable habitat for special-status species or potential for invasive weeds	Spring and Fall 2010 (To be determined based on rainfall patterns and optimum flowering times in 2010; minimum of three survey visits)
Jurisdictional Waters	• Delineation of jurisdictional waters within newly proposed areas of the revised project disturbance area • Follow-up surveys within previously delineated jurisdictional waters to determine functions and values • Delineation of jurisdictional waters within proposed compensation site(s)	No survey timing restrictions

The following terms will be used throughout the biological resources section of this Data Request response document to refer to the components of the RSPP:

- **AFC Biological Disturbance Area:** the total disturbance area reported in the Application for Certification (AFC) Biological Resources Section, which was reported as 1,738 acres the AFC document. The AFC Biological Disturbance area differed from the total disturbance area provided in other sections of the AFC because the water line disturbance area had not yet been surveyed and thus was not added to the disturbance area.

- **Project Disturbance Area:** the total Project Disturbance Area described in the AFC has been revised to include site reconfigurations discussed in the preceding text. The new project disturbance area, not including the Water Line Disturbance Area, is approximately 1,944 acres.

- **Water Line Disturbance Area:** includes the disturbance area for the entire water line line (~4.6 miles) and associated substation. The total Water Line Disturbance Area is 16.3 acres.

- **Biological Resources Survey Area (BRSA):** the total acreage for the BRSA described in the AFC has also been revised to include the additional Water Pipeline Disturbance Area and associated 1,000-foot survey buffer. The revised BRSA is approximately 9,785 acres (an increase of 473 acres from the BRSA presented in the Biological Resources Technical Report for the AFC [AECOM 2009]).

- **Spring 2009 Survey Area:** the area surveyed for the original site design during spring 2009, including the original disturbance area where focused resource surveys were conducted, and the associated CEC-required buffer areas (e.g., within 1,000 foot of linear Project elements and 1-mile of non-linear Project elements) where reconnaissance level surveys were conducted to characterize habitat. Results of surveys conducted in the spring 2009 survey area were reported in the AFC. The spring 2009 survey area includes only a portion of the current water pipeline disturbance area and associated 1,000-foot buffer; survey results from these areas were included in the AFC. See “October 2009 Reconnaissance Level Survey Area” for surveys conducted within the remaining portions of the current water pipeline disturbance area and 1,000 foot buffer.

- **October 2009 Reconnaissance Level Survey Area**: covers the portions of the water pipeline and 1,000-foot buffer not previously surveyed, the results of which were not included in the AFC. The results were included in the Data Adequacy Supplement submitted to the CEC on October 26, 2009. Note that surveys within this area were reconnaissance level only; protocol level surveys for some biological resources within this area remain outstanding and will be completed in spring 2010.

DR-BIO-53

Information Required:

Please provide maps and describe the importance of the project site to the local and regional desert tortoise populations regarding maintaining adequate connectivity for local and regional desert tortoise movement and genetic exchange.

Response:

The following response was prepared by Dr. Alice Karl, an expert on desert tortoise (DT) life history. Figure DR-BIO-53, which depicts regional and local desert tortoise connectivity, is provided in Attachment DR-BIO-53.

The importance of a site to the local population and species is defined by the following factors. Each is discussed in detail below.

1. Abundance of animals relative to other locations within the population.
2. Identified importance of the area for recovery and tortoise conservation, by the California Department of Fish and Game (CDFG) and United States Fish and Wildlife Service (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.
6. Heightened anthropogenic or other impacts that could result should the Project be built.

1. *Tortoise Abundance.* There are no readily available DT density data for the project vicinity, but several sampling programs suggest low to very low local DT densities. 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 2009a) and based on the 23 adult DT found in 702.1 hectares (1734.8 acres) (AECOM 2009). 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.

   Historically, density transects for the Ridgecrest area, including the Project site, estimated densities at 8-19 DT per km^2 (20-50 DT per square mile [mi^2]) (Berry and Nicholson 1984). This was considered a relatively low tortoise density at the time. During this same sampling program, 7640 km^2 (2950 mi^2) in California were estimated to have over 19 DT per km^2 and nine areas were estimated to have over 58 DT per km^2 (150 DT per mi^2).

   More recent transects conducted for the West Mojave Plan (WMP) in 1999 consistently found very low sign counts in the RSPP vicinity and Indian Wells Valley (U.S. Bureau of Land Management [BLM] 2005). On 23 of 25 transects, zero to three sign were observed; on the remaining 2 transects, four to eight sign were observed. During this same sampling program, there were many areas in the WMP planning area that had higher to substantially higher sign counts, indicating that the RSPP vicinity (Indian Wells Valley, Ridgecrest) is a low DT density area.

Recent sampling near Red Rocks State Park, west of the RSPP, suggested very low DT densities, fewer than four adult DT per km^2 (Keith et al. 2005).

Even using the USFWS-calculated estimate of 8.1 adult DT per km^2 presented in the RSPP AFC, this would be considered a historically low density. Table DR-BIO-53 shows the five trend plots studied by BLM in the western Mojave Desert that historically had the highest DT densities. Adult DT densities from the period 1979 to 1982 ranged from 36 to 92 adult DT per km^2. The three plots closest to the RSPP (the Fremont Valley plot and the two Desert Tortoise Natural Area [DTNA] plots), approximately 18 to 75 km away, respectively, had the highest densities. The other high-density plots in California had 38 to 83 adult tortoises per km^2.

Table DR-BIO-53
Estimated adult tortoise densities (# per km^2) for historically high density plots in California[1].

Historically High Density Plot	#Adults/km^2		Time Span for Estimates
	Time 1	Time 2	
Western Mojave Desert			
DTNA[2] Interior Plot	92	5	1982 to 1996
DTNA Interpretive Center	69	47	1979 to 1993
Fremont Valley	45	13	1981 to 1991
Kramer Hills	42	13	1980 to 1995
Lucerne Valley	36	25	1980 to 1994
Elsewhere in California			
Chuckwalla Bench	75	---	1979
Goffs	83	---	1983
Upper Ward Valley	38	---	1980
Ivanpah	42	---	1979

1. Data Source: BLM (2005), Berry (1990, 1997)
2. Desert Tortoise Natural Area (DTNA)

While the available data are relatively old for the later time periods (early to mid 1990s) and current densities are unknown, these are the most recent available data. The RSPP adult DT density is substantially lower than four of five western Mojave plots. Based on the historic and WMP sampling programs, which consistently showed very low DT abundance in the RSPP vicinity over time, evidence is lacking that DT densities in the RSPP were substantially higher historically, although they probably were somewhat higher based on the pattern of range-wide DT declines in the past two decades (Karl 2004, McLuckie et al. 2006, Boarman et al. 2008).

2. *Designated Conservation Area for the Desert Tortoise.* The RSPP and surrounding area have not been identified by the USFWS (1994a and b) and the BLM (2005) as an important area for DT recovery and population persistence (Figure DR 53-1). Desert Wildlife Management Areas and designated critical habitat are both approximately 7 miles south of the RSPP.

3. *Existing Anthropogenic Impacts.* The site is located directly south of U.S. Highway 395, a heavily traveled, major commerce and transportation route in California. Heavily traveled roads are known mortality sinks for DT and other wildlife (Nicholson 1978, Karl 1989, Boarman 1992, LaRue 1993, Marlow and von Seckendorff Hoff 1997, Rosen et al. 2007).

In addition, the towns of Ridgecrest and Inyokern, the "ranchette" community that has expanded away from the towns proper, and local agriculture (Inyokern, mostly) degrade and fragment the area's DT habitat. Not only is habitat removed and fragmented, but dogs (which prey on DT), children, and motor-based recreational activity typically expand to areas immediately outside desert towns. The result of these activities is increased loss and degradation of habitat and increased DT depredations and collections. In addition, ravens are 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 tortDToises 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.

4. *Connectivity Issues*. Based on the above analysis and aerial photographs, development of this site would not appear to impair connectivity within the population. First, there is no evidence that there are important population segments to connect given the low DT densities at the RSPP and a location that is already impacted by anthropogenic factors. Second, with the updated Project footprint refinement (Figure DR-ALT-49) 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) off-highway vehicles (OHV) traffic does not increase in these washes.

5. *mulative Population Fragmentation.* 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 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 an area. (For instance, DT occupying fragmented habitats around towns are also subject to the other negative influences associated with towns [see above]). It does not appear that development of the RSPP would result in a level of fragmentation that would reduce surrounding habitat to unusable fragments. From aerial photographs, there appears to be ample habitat, even if somewhat degraded by anthropogenic activities, in the surrounding area to support the use of the area by DT should the RSPP be built.

6. *Heightened Anthropogenic or Other Impacts That Could Result.* No new types of resources for DT predators would be added by the RSPP that are not currently in the Project vicinity.

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DR-BIO-54

Information Required:

Please provide a draft Desert Tortoise Translocation Plan that incorporates the most recent guidance from the Bureau of Land Management (BLM), United States Fish and Wildlife Service (USFWS), and California Department of Fish and Game (CDFG). The goals of this translocation effort should be to:

- translocate all desert tortoises from the project site to nearby suitable habitat;
- minimize impacts on resident desert tortoises outside the project site;
- minimize stress, disturbance, and injuries to translocated tortoises; and
- assess the success of the translocation effort by attaching transmitters to the translocated desert tortoises (desert tortoises in the receiving population should also be monitored to determine survival rates of translocated tortoises and what effect the translocated desert tortoises have on the receiving desert tortoise population).

Please discuss translocation procedures and guidance in the plan, including a description of clearance survey protocol and desert tortoise transportation and release procedures, and develop a post-translocation monitoring and reporting plan. All methods discussed in the plan should be consistent with the *Guidelines for Handling Desert Tortoises During Construction Projects* (Desert Tortoise Council 1999) or the most recent handling guidance provided by the USFWS.

Generally, the translocation plan should include the following information:

1) Identify potential translocation sites based on the presence of suitable soils, vegetation community, vegetation density and abundance, perennial plant cover, forage species, geomorphology, and slope.
2) Surveys of resident populations at translocation sites, including health assessment sampling and attaching transmitters to individuals.
3) Description of measures that would be implemented to prevent translocated desert tortoise entering the site or other hazardous areas.
4) Description of quarantine facilities to provide individual quarantine for all tortoises prior to translocation.

5) Description of health assessments that would be performed by qualified biologist or veterinarian on each tortoise prior to translocation.
6) A treatment/disposition plan for each tortoise, including those unfit for translocation.
7) Description of translocation procedures, including timing (e.g., time of year, time of day).
8) Description of post-translocation monitoring and adaptive management activities.
9) Description of methods used to mark translocated tortoises and fit them with transmitters so that they can be located and identified during post- translocation monitoring.
10) Description of methods used to mark existing tortoises in the receiving population and fit them with transmitters so that they can be located and identified during post- translocation monitoring.
11) Description of how data would be compiled, synthesized, and reported to USFWS, CDFG, BLM, and Energy Commission staff.

The translocation site must:

a) be on public lands that are conserved in perpetuity or private lands that are managed by a CPM-approved, (in consultation with CDFG and USFWS) non-profit organization qualified pursuant to California Government Code section 65965. In the event an approved non-profit holds title, a conservation easement shall be recorded in favor of CDFG in a form approved by CDFG; in the event an approved non-profit holds a conservation easement over the translocation site, CDFG shall be named a third party beneficiary;
b) satisfy the requirements of BLM and USFWS;
c) have no proposed rights-of-way or other encumbrances at the time of its establishment; and
d) be at least 15 kilometers away from major highways (e.g. Highway 395) to provide a safety buffer for long-distance movements that some desert tortoises are likely to make following translocation.

Response:

Please refer to Attachment DR-BIO-54, Draft Desert Tortoise Relocation/Translocation Plan, provided at the end of this section.

DR-BIO-55

Information Required:

Please provide a draft Raven Monitoring/Control Plan that describes methods to avoid attracting common ravens and/or providing associated facilities that may attract ravens during all phases of development and use, including construction, operation, and decommissioning. In situations where associated facilities such as power lines and structures for perching cannot be eliminated, the plan should require implementation of best management practices that reduce perching opportunities, monitor raven use of the area, and include raven nest removal. Potential attractions to be considered in the plan should include but not be limited to:

- availability of water from dust abatement activities, equipment cleaning and maintenance, evaporation and retention ponds, drainage areas or landscaping;

- potential perching, roosting, or nesting sites;
- avian carcasses from collisions with solar reflectors;
- food sources from soil disturbance and road kill (e.g., small mammals, insects); and
- food sources and attractants from human and animal food and waste.

To address the indirect and cumulative effects of the project, participation would also be recommended in a regional raven management plan either through monetary or in-kind contributions coordinated by the Desert Managers Group. The draft Raven Monitoring/Control Plan should incorporate the most recent guidance from the USFWS and include at least the following elements:

a) purpose/objectives of the Plan;

b) identification of project design features and other measures to manage potential introduction of anything that may attract ravens to the area;

c) identification of the area covered by the monitoring and raven control activities;

d) description of baseline data documenting the abundance of raven on the project site;

e) establishment of quantitative success criteria for achieving the objectives of the plan;

f) documentation of the effectiveness of project design features;

g) identification of triggers that will prompt implementation of management actions to control ravens, and a description of those management actions (e.g., nest removal, elimination of problem ravens);

h) description of a monitoring plan, including a discussion of survey methods and frequency, for establishing baseline data on pre-project raven numbers and activities and assessing post-project changes from this baseline;

i) description of adaptive management practices used to ensure effectiveness of accomplishing the purpose of the raven management plan;

j) regular reporting to document raven management measures that have been implemented and results of raven abundance and effectiveness monitoring throughout the life of the project; and

k) description of worker education, at all phases of development, as it pertains to avoiding and reducing attractions for ravens and promoting desert tortoise awareness.

Response:

Please refer to Attachment DR-BIO-55, Draft Raven Monitoring & Control Plan, provided at the end of this section.

DR-BIO-56

Information Required:

Please provide a Burrowing Owl Translocation and Management Plan that includes at least the following components:

a) Translocation Area Habitat Description: Provide a description of the habitat characteristics of the translocation area with respect to burrowing owls (for example, vegetation, topography, soils, level of disturbance, presence of suitable burrow sites). Include a figure depicting the location of the proposed translocation area and existing land use in and near the area.

b) Surveys of Translocation Area: Characterize the existing use of the proposed translocation site by burrowing owls, including surveys conducted in accordance with Phase II and Phase III Burrowing Owl Consortium Guideline protocols (CBOC 1993).

c) Habitat Modifications at Translocation Area: If artificial burrows for burrowing owls are proposed at the translocation site, provide a figure showing the location of the proposed burrow construction. Include survey information to verify that construction of burrows would not affect desert tortoise or Mohave ground squirrel habitat. Design of the artificial burrows should be consistent with CDFG guidelines (CDFG 1995).

d) Translocation Procedures: Provide a detailed description of clearance protocol, including trapping, transportation and release procedures, and provide a post-translocation monitoring and reporting plan. The plan should discuss attaching transmitters to burrowing owls that are being translocated and burrowing owls in the receiving population in order to determine effectiveness of the translocation effort. All methods discussed in the plan should be consistent with the most recent guidance from CDFG and USFWS.

e) Management and Monitoring Plan: Provide a long-term management and monitoring plan for the translocated population of owls which reflects site-specific conditions, and which provides details on methods for measuring compliance goals and remedial actions to be taken if management goals are not met.

Response:

Please refer to Attachment DR-BIO-56, Draft Burrowing Owl Relocation/Translocation Plan, provided at the end of this section.

DR-BIO-57

Information Required:

Describe how the mitigation for this project reduces the incremental cumulative impacts of this project and all reasonably foreseeable projects in the area on the regional burrowing owl population and how it maintains adequate connectivity for the regional population.

Response:

Potential cumulative impacts to biological resources, including western burrowing owl (WBO), as a result of Project implementation are discussed in Section 5.3.3.4, “Cumulative Impacts,” of the AFC. Cumulative impacts of the Project and all reasonably foreseeable projects in the area would be reduced through implementation of several mitigation measures. Potential direct and indirect impacts to WBO would be reduced through implementation of the avoidance, minimization, and mitigation measures described in Section 5.3.4 of the AFC; implementation of these measures would also reduce the Project’s contribution to a significant cumulative effect. In addition to the AFC mitigation measures, the Applicant is developing a compensatory mitigation approach to fully mitigate residual (i.e., unavoidable) direct, indirect, and cumulative effects on DT and Mohave ground squirrel (MGS), as well as WBO and other target species.

Land acquisition, preservation, enhancement, and management is anticipated to be the primary compensatory mitigation approach, combined with fee programs designated for specific activities that would promote the conservation of DT, MGS, WBO, and other sensitive resources. A comprehensive Habitat Mitigation and Monitoring Plan (HMMP) for the RSPP is presently in development and the Applicant has solicited direct input from the agencies. The Applicant has received several good ideas for mitigation but there remains internal conflict among the agencies regarding a uniform approach that all of the wildlife agencies can support. Even without that guidance, the Applicant is attempting to develop an HMMP that will describe the proposed approach to compensatory mitigation planning and design, including proposed minimum compensation amounts and criteria for identifying mitigation lands; an implementation plan; monitoring, adaptive management, and contingency measures; and enhancement and long-term management of mitigation lands. A preliminary draft HMMP will be provided on February 12, 2010; the compensatory mitigation approach for the HMMP is provided in the response to DR-BIO-72, below. Preservation and enhancement of lands that would maintain adequate connectivity for the regional populations of WBO, DT, and MGS would be a priority for acquisition.

DR-BIO-58

Information Required:

Please provide maps and describe the importance of the project site to the local and regional Mohave ground squirrel populations regarding, habitat quality and value, habitat fragmentation, and maintaining adequate connectivity for local and regional Mohave ground squirrel movement.

Response:

The requested maps are provided in Attachment DR-BIO-58 at the end of this section.

DR-BIO-59

Information Required:

Please provide a comprehensive and detailed Mohave ground squirrel active translocation plan. Development and implementation of this plan will reflect close coordination with CDFG. The plan should:

- identify the translocation site(s) and discuss why it (they) was chosen and found acceptable;
- describe the existing habitat suitability and if available, information regarding the population of Mohave ground squirrels on the translocation site(s);
- describe the protocol for trapping and transporting Mohave ground squirrels;
- describe the protocol for attaching transmitters to Mohave ground squirrels in order to determine effectiveness of the translocation effort; and
- include a monitoring and reporting plan for the transmittered Mohave ground squirrels.

Response:

MGS is not known to be currently occupying the Project site but could occur. Dr. Phil Leitner, an expert on the life history of the MGS, has expressed serious concerns regarding the effectiveness of any attempt to translocate this species. Nonetheless, the Applicant has directed Dr. Leitner to prepare a translocation plan to comply with the Data Request. Dr. Leitner incorporated many of his concerns regarding MGS translocation into his response below. Based on these concerns, the feasibility of implementing an effective translocation program appears to be highly questionable. The Applicant is committed to implementing reasonable avoidance and minimization measure to reduce Project impacts to MGS. However, rather than attempting to implement a translocation program that would have little, if any, chance of success, the Applicant proposes to proceed with grading without trapping, recognizing that any incidental take of MGS could be covered by a California Endangered Species Act (CESA) incidental take permit.

The RSPP site (Project site) is located in the high northern Mojave Desert in northeastern Kern County, California, about 5 miles southwest of the City of Ridgecrest, California (Figure DR-BIO-56-1). The Project right-of-way, for which the Applicant has applied to the BLM, includes approximately 3,920 acres of public lands owned by the Federal government. The total disturbance area is estimated at 1,944 acres including an additional 16.3 acres resulting from construction of the water pipeline off site.

One or more translocation sites will be selected that is/are suitable for and can accommodate all species to be actively translocated from the Project site, including DT, MGS, WBO, desert kit fox, and American badger.

Since the translocation site(s) has/have not yet been selected, it is not possible at this time to describe habitat suitability or any MGS population that may exist on the site(s).

The protocol for trapping MGS and translocating them from the project site will include the following elements:

1. The entire disturbance area of 1,944 acres will be trapped for 10 days, by a qualified biologist, in order to have a reasonable chance of capturing all MGS present. This trapping will require approximately 55-60 grids of 100 traps at the standard spacing of 35 meters, since 100 traps is the maximum that can be operated by a qualified biologist. Because of logistical difficulties concerning the number of qualified biologists and traps available, it will be necessary to set up 5 trapping sessions with 11-12 grids per session. Allowing a day to set up grids and a day to take them down, plus 3 days of rest for the trapping personnel, it will take approximately 2.5 months to complete the trapping effort.

2. In order to prevent MGS from moving into areas that are currently being trapped or have been trapped, it will be necessary to construct a squirrel-proof fence around the entire disturbance area and around each of the 5 trapping areas prior to trapping. Since MGS are excellent at climbing and burrowing, these fences will be constructed of smooth sheet metal at least 4 feet in height and extending at least 3 feet into the soil. The metal sections will be attached laterally with no gaps and inspected daily to ensure that they remain squirrel-proof. Because there has never been any attempt to construct a squirrel-proof fence, there can be no guarantee that this proposed design will work. A potential side effect of constructing and maintaining a secure fence will be to trap other wildlife species such as white-tailed antelope squirrels, black-tailed jackrabbits, and kangaroo rats.

3. Timing of the trapping effort will be critical. MGS are dormant underground beginning as early as May (adult males) or as late as September (juveniles). Adult males become active as early as February 1, while adult females usually do not emerge until about February 15. Therefore, the time period for trapping and translocation would extend from February 15 until May 15, or about 3 months. Mating occurs from about February 15-March 7 and females are pregnant for about 4 weeks, during which time they construct special natal burrows. Young are born in the natal burrows from about March 25 through April 10. The mothers lactate for about 5 weeks, while the litter of young shelter in the natal burrows. Weaning occurs in early May and the litters continue to use the natal burrows until mid-May. In late May and early June, the young may undertake dispersal movements of up to 5 miles. In order to accomplish 2.5 months of trapping, it will be necessary to pursue this trapping effort during the period when pregnant females are constructing natal burrows and during the subsequent weeks when lactating females and their litters are utilizing these natal burrows. The stress of translocating adult females during this period may result in some level of reproductive failure and possible mortality, while removal of lactating females could lead to death of their litters. It is not possible to quantify these adverse impacts, but the risks should be clearly understood.

4. Captured MGS will be transferred from the trap to a wire mesh cage provided with bedding and food. The cage with be covered with a cloth to reduce stress on the animal. They will normally be transported to the translocation site and released on the day of capture in an area where burrows are available. If an animal is captured late in the day, it will be kept in the cage in a quiet area until the next morning when it will be released. The transfer will be accomplished by a qualified biologist.

In order to evaluate the effectiveness of the translocation effort, translocated MGS will be monitored by radio-telemetry after their release at the translocation site. This group of animals will include adequate samples of adults and young of both sexes as available. The type of transmitter and the attachment method will follow the description of methods in Harris and Leitner (2004).

All translocated animals fitted with transmitters will be monitored by a qualified biologist using a portable receiver and hand-held antenna. For the first month after translocation, each animal will be located daily and its coordinates established by GPS receiver. After that, all animals will be located once a week until they enter dormancy or there is evidence of mortality. An attempt will be made to capture each animal once a month to evaluate its condition and be sure that transmitters are fitting well. If the signal is lost and it seems possible that the animal has left the translocation site, an attempt will be made to locate it from a light aircraft equipped for this purpose. This will be an important component of the monitoring program, as animals may attempt to return to their original location. The locations at which animals enter dormancy will be noted and trapping will be carried out in early spring of the following year in order to confirm over-winter survivorship and remove transmitters. Reports of monitoring results will be made on a monthly basis, with a summary report submitted in the fall, and a final report prepared the following spring. These reports will provide location data for each individual with maps and an analysis of the overall effectiveness of the translocation program.

<u>Constraints and Concerns Related To MGS Translocation</u>

There has been only one previous attempt to translocate MGS from a development site. In this case, 18 animals were trapped and then immediately released several km away on conservation land. Although the translocation was apparently approved by CDFG and the animals were marked with PIT tags, there was no requirement for follow-up studies. Therefore, we have no information regarding the success or failure of this translocation project. Unlike the situation with the DT, there is no existing evidence to indicate that translocation of MGS would be beneficial.

There are a number of concerns about active translocation of MGS from the RSPP site:

1. It will be necessary to construct extensive metal fencing prior to trapping. There is no guarantee that this fencing will be effective in preventing movement of MGS into areas that have been cleared by trapping. Furthermore, the potential adverse impacts of such fencing on other desert wildlife are unknown.
2. Because of the enormous magnitude of the trapping effort, it will have to be conducted over approximately 2.5 months during the time when the species is active aboveground. Even in a reproductive year, the entire adult population is active and trappable only from February 15 through May 15, just 3 months. Adult females construct special natal burrows starting about March 15 and young are restricted to these burrows until weaned at about 5 weeks of age. The young are not trappable until early May, while adult males begin to enter dormancy in late May. Therefore, trapping and removing adult females between late March and early May could condemn the helpless young in the natal burrows to starvation and death.
3. Although potential translocation areas with apparently suitable habitat exist in the region surrounding the RSPP site, there are no data available concerning the MGS populations at any potential translocation area. The past three years have been characterized by low winter rainfall in the Ridgecrest area, so it is reasonable to assume that habitat carrying capacity has been substantially reduced. Adding translocated animals to an area where the existing population is probably already under stress does not seem wise. The only reason to conduct a translocation project would be to salvage animals that could survive to reproduce in their new location. If extra animals are moved to an area where resources are already limited, it is very likely to result in higher mortality and reduced recruitment in both the receiving population and among the translocated animals.

It may be beneficial to actively translocate DT, since they can be easily detected and captured and since they may live and reproduce for many years after translocation. Furthermore, there is some experience with this practice that suggests it may be beneficial to the species. However, to apply this method to a small rodent which is difficult to capture, is trappable for a very limited period each year, and has a short lifespan is very questionable.

DR-BIO-60

Information Required:

If during consultation with CDFG it is determined that an additional delineation is needed, please revise the delineation of ephemeral drainages as directed by the CDFG. Please provide all information requested to CDFG.

Response:

The CDFG (represented by Environmental Scientist Dave Hacker) conducted a site visit with AECOM (represented by Ecologist Joshua Zinn) on December 2, 2009 to verify the field findings of the RSPP Jurisdictional Delineation Report (JDR). Based upon this field visit and in consultation with the CDFG's Lake and Streambed Alteration Program, the CDFG has concluded that:

1. The streambed of El Paso Wash comprises all points within the highest point of confinement. The natural dike features, which define the floodplain, define the streambed. In this case, this is close to the already-mapped FEMA floodplain, except that the CDFG jurisdiction would go to the top of the bank or "highest point of confinement". Mapping the extent of these should be based on the presence of a channel that moves water and sediment and extended to the highest point of confinement of those waters at their highest flow.

2. The features that had previously been characterized as swales are also state jurisdictional streambeds and therefore potentially subject to Streambed Alteration Agreements. The swale features will be considered as ephemeral streams (as the CDFG considers that these swale features demonstrate evidence of sediment transport, channel form, and natural levee formation from high flows). Whether the CDFG would require Streambed Alteration Agreements for all of these features is discretionary (if the CDFG determines that the alteration is not substantial, the CDFG would not require a Streambed Alteration Agreement for these features).

Although the CDFG does not provide Streambed Alteration Agreements for CEC projects, they do make recommendations to the CEC. Based upon the CDFG's guidance and recommendations concerning potential jurisdictional waters of the state, the RSPP JDR will be revised in accordance with CDFG guidance and submitted for approval prior to March 5, 2010. The Applicant strongly disagrees that the features previously characterized as swales are jurisdictional and even though these features will be mapped in the revised JDR in order to be responsive to this request, this remapping should not be deemed as acceptance that the swales are jurisdictional streambeds, which would require a Streambed Alternation Agreement.

DR-BIO-61

Information Required:

Please provide a copy of written communication from the USACE that states there are no jurisdictional waters of the United States that will be disturbed for the RSPP project.

Response:

The RSPP JDR has been assembled as a Jurisdictional Determination (JD) package for review by the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (USEPA) in support of issuing a JD that concludes that all formally delineated aquatic features occurring within the proposed footprint of the Project are nonjurisdictional (i.e., are not waters of the United States under the regulatory administration of the USACE). The Approved JD Form is included as Attachment 2 to the RSPP JDR.

The RSPP JDR was initially submitted to Mark Durham (South Coast Branch Chief) of the USACE Los Angeles District on October 23, 2009 for review for the purpose of issuance of a jurisdictional determination. A copy of the RSPP JDR was submitted to the CEC on October 23, 2009. Personal Communication with Mr. Durham concerning the status of the RSPP JDR was made on January 4, 2010. Mr. Durham responded that the JD is currently under review by the USEPA. As of this date, no JD concerning federally regulated aquatic resources has been made by USACE/USEPA for the RSPP. Once the JD is received, it will be immediately docketed with the CEC. However, for purposes of the Staff analysis, we believe the JDR provides strong evidence that the project will not affect US jurisdictional waters.

DR-BIO-62

Information Required:

Please provide a detailed discussion, with supporting analysis, for the implementation of a low impact development approach to managing stormwater flows. This should include completed engineering plans with re-vegetated channels and features that enhance use of the channel as wildlife movement corridors such as vegetated terraces and wide partially vegetated channels. FEMA floodplains and other non-State Waters alluvial features should remain intact and connected to the re-routed channels to the maximum extent practicable to retain the hydrologic and ecological functions of those features. A monitoring plan should accompany the re-routed channel plan that includes re-vegetation goals and a monitoring program to reach and maintain those goals (success criteria) (see number 13 below).

Response:

A natural vegetated buffer around the El Paso Wash is being incorporated into the site plan to further contribute to a low impact development approach. Attenuation design would result in not significantly diverting natural flow, in terms of volume and occurrence, away from the El Paso Wash, so that the natural communities supported by the wash would be minimally impacted. These measures will retain the wash's hydrologic and ecological functions and allow for the continued use of the El Paso Wash as a wildlife movement corridor. Please see the response to DR-BIO-66 for more information regarding the restoration and revegetation strategy for the portions of the El Paso Wash that would be permanently and temporarily impacted by the crossings and drainage channel tie-ins described above.

Regarding stormwater management within the Project footprint, the resource management agencies have expressed a preference to move water as quickly through the Project site as possible in order to reduce water quality impacts and to avoid the collection of standing water that could attract ravens or result in other indirect adverse impacts. Therefore, the remaining smaller watercourses and the washlets and swale complexes impacted by the facility footprint will be designed as engineered channels. They will not be enhanced or revegetated and as such mitigation credit for re-creation of these aquatic features is not being requested. The absence of revegetation or other enhancement also would reduce the likelihood that the engineered channels, which require maintenance as part of facility operations, would become an attractive nuisance to wildlife species. The RSPP is currently pursuing mitigation opportunities for impacts to State jurisdictional waters. The on-site drainage improvements would seek to replicate the existing flow patterns as closely as possible and each of the proposed off-site channels are being sized to contain the peak flow of the 100-year flow rate. Impacts to the existing downstream drainage patterns and flow rates would be minimized, but would be slightly changed due to minor changes in contributing drainage areas and times of concentration. Please see the response to DR-BIO-63 for more information on downstream effects.

The original design for this site has been revised to incorporate a low-impact development approach to the stormwater flows. The proposed area of development has been pulled away from the El Paso Wash so that the flows in the Wash are not re-routed as a result of this project. The revised site plan keeps the developed area of the solar fields out of the channel and above the banks of the Wash at all locations. The vegetation and biology in the 2.5 miles of El Paso Wash that is adjacent to the site is intended to remain undisturbed except for one new pipe bridge crossing which is approximately 100-feet wide, and some localized drainage channel connections between the Project site and the El Paso Wash. The existing Arizona crossing of the Wash at Brown Road has been maintained and is not proposed to be modified. The FEMA floodplain would remain intact with all localized drainage from the pre-development site continuing to be discharged to the Wash through redirected channels as part of the drainage plan for the post-development site. Engineering plans for the re-designed project site will be provided on February 10, 2010 and a new drainage report for the re-designed site will be provided on February 24, 2010.

A monitoring plan for the re-routed channels, including re-vegetation goals and a monitoring program to reach and maintain those goals (e.g., success criteria), is provided in the Draft Channel Maintenance Plan in Attachment DR-BIO-65.

DR-BIO-63

Information Required:

> Please provide a detailed discussion, with supporting analysis, of the downstream effects of redirecting water away from the unnamed washes at the southwest side of the project, of directing those waters into the El Paso wash upstream of the existing confluence, and of re-routing the El Paso Wash. Specifically, discuss the effects to ecological functions and values and the extent of those effects downstream of the redirected flows. In other words, to what degree and how far downstream would the project affect the hydrology and sediment transport such that it impacts wildlife habitat features off of the project site.

Response:

As described in the data response introduction, the Ridgecrest site plan has been reconfigured to minimize impacts to natural stormwater flows across the El Paso Wash. The El Paso Wash will no longer be re-routed and natural flows would be maintained (see DR BIO-62). A post-Project functions and values assessment will be provided in early spring 2010 after the revised disturbance area, drainage plans, Storm Water Pollution and Prevention Plan (SWPPP), and other relevant Project plans are finalized and supporting data is available.

There is one un-named small ephemeral dry wash located near the southwest side of the site that would be slightly redirected around the southwest corner of the site prior to being returned to its original flow path. This small wash currently connects downstream to the El Paso Wash. There is no diversion into the El Paso Wash upstream of the existing confluence and no re-routing of the El Paso Wash. The site will be elevated on the south side of the development such that the flows from this small ephemeral dry wash would be allowed to flow westerly along the edge of the soil berm and then outward to find its natural drainage path in a low impact method of drainage flow management as proposed by the CEC and BLM. The re-directed drainage flow will join the west leg of the El Paso Wash in the same location as it currently does in the pre-development condition. The hydraulic flows would essentially remain the same as currently exists and there is not anticipated to be any sediment transport as a result of this minor diversion. The flow path of the drainage area is slightly longer in the post-development condition thus creating a lower slope, less velocity, and no increase of sedimentation as a result of this minor diversion. A new drainage report associated with the re-designed site plan will be provided on March 5, 2010 and will show that the drainage subareas in this southwest corner of the project are relatively undisturbed and unchanged.

The downstream xeric riparian functions and values assessment will utilize the Hydrogeomorphic Approach (HGM) to qualitatively assess the physical, chemical, and biological functions and values of Mojave Desert wash scrub and unvegetated ephemeral dry wash. A synthesis of the methodologies and definitions outlined in resource agency issued guidance documents will be employed for this analysis. The quantitative assessment for biological functions and values of Mojave Desert wash scrub and unvegetated ephemeral dry wash will utilize the latest project design in concert with hydrological calculations (including flood data). The potential for downstream scour, sedimentation, and changes in hydrologic flows, volume, and timing will be evaluated, informing the assessment of potential effects to off-site wildlife habitat features.

DR-BIO-64

Information Required:

Please provide a detailed discussion, with supporting analysis, of the potential for erosion and wildlife habitat impacts at the outlet of the proposed engineered channel on the northeast side of the project. The proposed channel would concentrate sheetflow and the flows from multiple small channels and redirect it to a single point in upland habitat.

Response:

As described previously, the site plan has been reconfigured to minimize impacts to natural stormwater flows through the El Paso Wash. Engineered drainages along the perimeters of both the north and south solar fields are being redesigned to accommodate the new solar field configuration. Due to the redesign of the Project area and subsequent redesign of proposed engineered channels throughout the Project area, the drainage configuration that is the subject of DR-BIO-64 no longer exists in the proposed plan. Post construction, drainage on the northeast side of the north solar field will be conveyed by an engineered channel that will direct water in a manner similar to the existing natural channel. The engineered channel would then feed water back into the natural channel north of the Project area. Please refer to DR-BIO-65 (Channel Maintenance Plan) for information regarding the construction and maintenance of the proposed engineered channels within the Project area. Revised plans, including a SWPPP and a Drainage, Erosion, and Sediment Control Plan, are being prepared, which will outline standard measures to minimize erosion and protect wildlife habitats during project construction and operation.

DR-BIO-65

Information Required:

Channel Maintenance Program: Please provide a draft Channel Maintenance Program for routine maintenance activities, as well as capital improvement projects and emergency repairs. The Channel Maintenance Program should include at least the following elements:

i. *Purpose and Objectives:* Include a discussion of the main goals of the Channel Maintenance Program (for example, maintenance of the diversion channel to meet its original design to provide flood protection, support mitigation, protect wildlife habitat and provide habitat connectivity, and maintain groundwater recharge).

ii. *Guidelines for Maintenance*: Define standards for acceptable conditions and action triggers for: sediment removal, vegetation management, debris collection, blockage removal, fence repairs, and access road maintenance. Discuss bank protection and grade control structure repairs that might be needed to repair eroding banks, incising toes, scoured channel beds, as well as preventative erosion protection. At a minimum the applicant would need to implement instream repairs when the problem (1) causes or could cause significant damage to the project, adjacent property, or the structural elements of the diversion channel, (2) is a public safety concern, (3) negatively affects groundwater recharge, or (4) negatively affects the mitigation vegetation, habitat, or species of concern. Include a discussion of routine channel maintenance - trash removal and associated debris to maintain channel design capacity; repair and installation of fences, gates and signs; grading and other repairs to restore the original contour of access roads and levees (if applicable); and removal of flow obstructions at RSPP storm drain outfalls. Describe how capital improvement projects and emergency repairs would be funded and implemented.

Response:

Please refer to Attachment DR-BIO-65, Draft Channel Maintenance Program, provided at the end of this section.

DR-BIO-66

Information Required:

Re-vegetation Plan for Re-Routed El Paso Wash: Please provide a draft Re-vegetation Plan for the re-routed El Paso Wash that include at least the following elements:

- *Overall Goals*: Explicitly state the overarching goal of the re-vegetation plan, which should include at least replicating the hydrological and biological functions and values of the impacted desert washes.
- *Existing Functions and Values*: Describe the existing functions and values of the drainages that are being replaced by the engineered channels. Include a discussion of the characteristic soils (biological soil crust, permeability), sediment transport and other geomorphic processes, microtopography (microcatchments for moisture, seeds), vegetation (zonation, composition, cover density, dominants in each stratum, rare or uncommon species or communities, non-native component), and wildlife habitat and values (connectivity, rare species, habitat elements).
- *Reference Reach:* Select one or several reference reach(es) of the existing channels that would provide a target for mitigation design and success criteria, and provide photos and a hard-copy and GIS [shape files & metadata] map of the reference reach(es). Provide a detailed description of the reference reach and how the features of the reach(es) relate to the success criteria for the mitigation design and goals. Include a rationale for selection for the reference reach(es).
- *Proposed Mitigation Design:* Describe the mitigation goals and target functions/values (hydrologic, geomorphic, water quality, habitat function/value) of the re-vegetation plan and a rationale for these goals and targets.
- *Success Criteria:* Provide a table of success criteria and quantitative parameters to measure successful achievement of these criteria. The criteria should address each major aspect of the project, including replication of natural hydrological and geomorphological processes and establishment of appropriate vegetation and wildlife habitat values.
- *Monitoring Methods:* Describe proposed methodology for measuring progress toward success criteria and a rationale as to why each method has been chosen to evaluate progress in relation to each success criterion. Describe sampling methods used and include size of sample units and number of samples.
- *Monitoring Schedule:* Monitoring should be tied to the appropriate spring growing season, with the “first year” of monitoring occurring one full growing season following completion of installation. Given the slow pace of revegetation in desert ecosystems, a monitoring duration of 10-years is appropriate. In addition to quantitative methods, ground and/or aerial photos can be used to illustrate year-to-year progress of the overall project.
- *Implementation Plan:* Describe equipment, procedures, access paths, and any measures used to avoid sensitive areas outside of the grading plan during re-vegetation. Of particular importance is topsoil storage and disposition. The implementation plan should include a description of how the top layer (top 1 inch) of soil will be salvaged from the existing washes, stockpiled and maintained to sustain viability, and how these soils will be applied during revegetation efforts. Indicate storage location of topsoil, area required for storage, duration of intended storage, and ultimate disposition of topsoil material in the engineered channels. Discuss how the area available for re-vegetation in the channel bottom would integrate with the channel slope protection and erosion control and any opportunities for bioengineering.

- *Weed Control:* Describe method(s) to be used to remove noxious plants from the mitigation site during the course of re-vegetation and monitoring, and specific triggers for when weed control is required.
- *Planting/Seeding:* Provide a table of species to be planted and indicate geographic source of plants (of local origin), type of propagules to be used, and season in which seeding/planting/transplanting is to be done. Include size and quantity of propagules and/or intended spacing. For transplant propagules, describe method, location of harvest site, and duration of storage, if applicable
- *Irrigation:* Most mitigation projects should become hydrologically self-sustaining. The function of irrigation in the early years of a project is to give new vegetation a head start at becoming established. Describe any proposed irrigation methods, including estimated frequency, and indicate month(s) in which it is to occur. Also indicate water source(s) for irrigation.
- *Implementation Schedule:* Provide a schedule showing intended timing (by month) of site preparation, any seed/topsoil storage, seed/topsoil application, and plantings.
- *Maintenance and Monitoring:* Describe planned maintenance activities (e.g. inspection of irrigation system, inspection of water structure(s), erosion control, weeding, etc.). Identify any pest species (plant and/or animal) that might cause problems on the site, and provide a control plan for these species if appropriate. Indicate the critical threshold of disturbance that will trigger the implementation of control methods. Provide a table showing proposed schedule of frequency of maintenance inspections over the life of the project.
- *Monitoring Reports:* Monitoring reports to the CPM are typically due January 31st of each year. Describe the overall content and purpose of the annual reports.
- *Contingency Measures:* If an annual performance goal is not met for all or any portion of the mitigation project in any year, or if the final success criteria are not met, describe how the failure will be remedied. Include a process for analysis of the cause(s) of failure and propose remedial action for CPM and agency approval. Remedial actions might include replanting, weed or herbivore control. Provide a funding mechanism to pay for planning, implementation, and monitoring of any contingency procedures that may be required and present all necessary assurances that the funds will remain available until success criteria have been achieved.
- *Long-Term Management:* Integrate long-term management (weed/vegetation management, preventing wildlife entrapment hazards) with the Channel Maintenance Program described above.

Response:

As previously described, the Ridgecrest site plan has been reconfigured to minimize impacts to the El Paso Wash, and this wash will no longer be re-routed. However, there would be some areas of temporary and permanent impacts to the Wash, due to the Project's crossings and drainage channel tie-ins along the Wash. Mitigation for these impacts, once quantified, would be addressed as part of the Project's overall mitigation strategy to be determined. After impact calculations have been revised, the Applicant will consult with the resource agencies to determine if revegetation is necessary given that it is anticipated that the impacts will be substantially reduced due to the reconfiguration.

Existing Functions and Values

A detailed qualitative functions and values assessment of the existing conditions of the previous disturbance area was provided as a component of the revised JDR submitted November 25, 2009. This revised JDR is also a component of the RSSP Notification for a Lake and Streambed Alteration Agreement. A revised detailed qualitative functions and values assessment for the final disturbance area will be provided after supplemental field delineations take place during spring of 2010.

A qualitative assessment of xeric riparian functions and values will be provided using the HGM and the methodologies and definitions outlined in:

- A Hydrogeomorphic Classification for Wetlands as a guide (Brinson et al. 1995).
- An Approach for Assessing Wetland Functions Using Hydrogeomorphic Classification, Reference Wetlands, and Functional Indices (Smith et al. 1995).
- The Ecological and Hydrological Significance of Ephemeral and Intermittent Streams in the Arid and Semi-arid American Southwest (USEPA 2008).
- Wetland Values: Concepts and Methods for Wetlands Evaluation (USACE 1979).
- USEPA Watershed Academy: Wetland Functions and Values (USEPA 2009).
- United States Geological Survey (USGS) Water Supply Paper 2425: Wetland Functions, Values, and Assessment (USGS 1996).

Literature Cited

Brinson, M., R. Rheinhardy, F. Hauer, L. Lee, W. Nutter, R. Smith, and D. Whigham. 1995. A Guidebook for Application of Hydrogeomorphic Assessments to Riverine Wetlands. U.S. Army Corps of Engineers Waterways Experiment Station. Wetlands Research Program Technical Report WRP-DE-11. December 1995 – Operation Draft.

Smith, D. R., A. Ammann, C. Bartoldus, and M. M. Brinson. 1995 An Approach for Assessing Wetland Functions Using Hydrogeomorphic Classification, Reference Wetlands, and Functional Indices. Technical Report WRP-DE-9, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. NTIS No. AD A307 121.

U.S. Army Corps of Engineers (USACE). 1979. Wetland Values: Concepts and Methods for Wetlands Evaluation. Research report 79-R1, U.S. Army Corps of Engineers, Institute for Water Resources, Fort Belvoir, Virginia.

U.S. Environmental Protection Agency (USEPA)
2008. The Ecological and Hydrological Significance of Ephemeral and Intermittent Streams in the Arid and Semi-arid American Southwest. Office of Research and Development.
2009. Watershed Academy http://www.epa.gov/watertrain/index.htm.

U.S. Geological Survey (USGS) 1996. Water Supply Paper 2425: Wetland Functions, Values, and Assessment. Available at: http://water.usgs.gov/nwsum/WSP2425/functions.html.

DR-BIO-67

Information Required:

Please include an assessment of the feasibility of reconfiguring the project footprint to retain some or all of the project area ephemeral drainages with setbacks from the banks of the drainages to accommodate a buffer for protection of water quality and to provide wildlife habitat connectivity.

Response:

As described in the data response introduction, the Ridgecrest site plan has been reconfigured to minimize impacts to natural stormwater flows across the El Paso Wash. As a result of the proposed site realignment, the El Paso Wash will be avoided, with the exceptions of the crossing of Brown Road, the HTF pipe bridge, the new 230-kV transmission line, and 8 to 10 drainage channel tie-ins. See DR-BIO-62 for a discussion of the development setbacks and treatment of smaller watercourse and washlets that would contribute to protection of water quality and maintain wildlife habitat connectivity within the proposed site plan reconfiguration. Please see other data responses included in this submittal for a discussion of how the reconfigured Project contributes to maintaining habitat connectivity for DT (BIO-DR-53), WBO (BIO-DR-56 and 57), and MGS(BIO-DR-58). An updated JDR will be prepared to reflect the revised site plan and will incorporate CDFG's guidance and requests regarding ephemeral features (See DR-BIO-60). A revised functions and values analysis for the current and post-project conditions will be included, per DR-BIO-63 and DR-BIO-66b, after supplemental field delineations take place during spring of 2010. These documents will further evaluate the Project's effects on water quality as they relate to ecological function and wildlife habitat.

DR-BIO-68

Information Required:

Please discuss whether surveys were conducted, remote imagery analysis (of high resolution aerials) was used, or other types of review for possible creosote bush rings in the project survey area were undertaken, and if so, the results of the surveys including a map depicting the locations of creosote rings. If no such analysis was made, please provide a recent analysis and maps of creosote bush rings on the project site.

Response:

Potential creosote rings on the Ridgecrest site were identified by methodically scanning high-resolution (one-foot) aerial imagery of the region in the ESRI ArcGIS software environment (Towill 2009) and Google Earth 5.1. A creosote ring preserve in Lucerne Valley, California was used as a visual reference for identifying creosote ring features in aerial imagery. At each site, the GIS analyst scanned imagery at 1:1,200 scale (one inch equals 100 feet) for creosote ring features. This scale was determined adequate (based on the reference site) to identify ring features greater than 10 feet in diameter. After scanning the extent of the aerial photo visible onscreen, a graphic mask was applied to indicate that the area had been surveyed. This reduced the amount of time spent re-visiting surveyed areas and also ensured total coverage of the site. Point features were placed on potential ring features to be revisited for closer examination.

After scanning the entire disturbance area, features identified as potential creosote rings were re-examined in greater detail. While these features were ring-shaped and greater than 10 feet in diameter, it was determined that some involved shadow and terrain and those features were excluded. Fifty potential creosote rings greater than 10 feet in diameter were determined to be present in the project disturbance area. These features have not been ground-truthed. However, the aerial imagery used is considered sufficient for this analysis. A map of the location of the potential creosote rings is seen in Figure DR-BIO-68 included in Attachment DR-BIO-68, provided at the end of this section.

DR-BIO-69

Information Required:

Please prepare a Weed Management Plan that includes at least the following elements:

a) Plan Goals and Objectives: Define the goals of the Weed Management Plan. At a minimum, the Weed Management Plan should include a goal that the plan will protect the biological resources surrounding the project from the harmful effects of weeds and potential unintended harm from weed management techniques, and will be consistent with all applicable LORS. Identify specific weed management objectives (eradication, suppression, or containment) for each non-native plant species that could potentially threaten the areas affected by the project.

b) Noxious Weed Inventory/Baseline Conditions: Please describe the baseline conditions (weeds found, vectors, population densities, etc.) and provide an approximate distribution map showing concentrations of the noxious weeds and other invasive non-native plants in the project buffer. The complete project site will be denuded so this information is not needed for the site.

c) Define and Map the Weed Management Area: Identify the areas that will be included as part of the Weed Management Area (WMA), which should include at least project facilities, linear facilities and a buffer area 100 feet out from the boundary of these features; access roads and a buffer 25 feet out from both sides of the roads. A GIS-based map of the project area should be included to clearly define these buffer zones and facilities as part of the Weed Management Area.

d) Weed Risk Assessment: Consistent with BLM guidelines for weed management, conduct a weed risk assessment for each component of the Project construction, operation, and closure that involves soil disturbing activities or altering vegetation; the stepwise risk assessment is available online at: http://www.blm.gov/ca/st/en/prog/weeds/9015.html.

e) Monitoring and Survey Methods: Describe survey and monitoring methods that will be used during construction and operation to ensure timely detection and prompt eradication of weed infestations. Describe how locations of noxious weed occurrences and other data (detection date, growth stage, infestation extent, treatments implemented, results of treatment, and current status) will be mapped and maintained during the construction and operation phases.

f) Weed Management: Describe measures that will be employed during construction, operations and site closure to prevent the establishment of new weed species, eliminate small, rapidly-growing infestations, prevent large infestations from expanding, and reduce or eliminate large infestations. Include implementation schedules, monitoring reporting requirements, budgets, and responsible parties. Include the following elements: Prevention & Exclusion; Early Detection & Rapid Response; Eradication & Management; Restoration (of treated sites); Employee Education & Training; Funding & Resources; Enforcement & Compliance. Please refer to BLMs Weed Prevention and Management Guidelines online: http://www.blm.gov/ca/st/en/prog/weeds/weedprevent.html

g) Reporting Requirements: Describe the proposed content of construction-phase monitoring reports and longer term weed control progress reports. Reporting during construction should include monthly summary reports describing observations and activities relevant to noxious weeds management, and a compilation and analysis of this information into quarterly reports. Upon completion of construction a report should be prepared describing the overall results of noxious weed management and current weed status at the project site. Thereafter annual monitoring reports should be produced for the duration of the monitoring period. The annual reports should include information on noxious weed surveys and management activities for the year, a discussion of whether the weed management goals for the year were met, and recommendations for weed management activities in the upcoming year.

h) h. Attachments/Other Information: If the following elements were not included in the body of the report they could be included as attachments to the Weed Management Plan: detailed maps (see map guidelines, above); herbicide use protocols and sample record forms; sample monitoring data forms; Cal-IPC and CDFG rankings and ratings and details on management strategy and control methods for each observed and potentially occurring noxious weed on the project site; species -specific goals and Objectives (measurable, with time frame); methods for evaluation of success in achieving weed control goals.

Response:

Please refer to Attachment DR-BIO-69, Draft Weed Management Plan, provided at the end of this section.

DR-BIO-70

Information Required:

Please provide a translocation plan for American badger. The plan should include a description of the protocols to be used for capture, transport, and release of American badgers and a discussion of the potential receiving site and why it is determined to be acceptable. This plan should reflect close coordination with the relevant agencies.

Response:

Please refer to Attachment DR-BIO-70, Draft American Badger Translocation Plan, provided at the end of this section.

DR-BIO-71

Information Required:

Please provide information on the location and characteristics of the lands proposed for compensatory mitigation for Species of Special Concern, the associated enhancement and endowment costs, and the long-term monitoring plan for these compensation lands. The discussion of off-site compensation habitat should reflect close coordination with the relevant agencies (Energy Commission staff, CDFG, USFWS, and BLM).

Response:

Lands proposed as compensatory mitigation for Species of Special Concern that would be affected by the RSPP have not yet been selected. Therefore, it is not possible at this time to provide detailed site-specific information on the location, characteristics, enhancement and endowment costs, or long-term monitoring of compensatory mitigation lands. However, the response to DR-BIO-72, below, describes the compensatory mitigation approach, including how suitable mitigation lands would be located and evaluated, how enhancement and endowment costs would be estimated, and information on the development of long-term management and monitoring plans. Please refer to DR-BIO-72 for a complete response to this data request.

DR-BIO-72

Information Required:

Please provide a compensatory desert tortoise habitat mitigation proposal that fully mitigates the proposed impacts of the taking, as described in California Code of Regulations §783.4.

- For compensation lands intended to satisfy California Endangered Species Act (CESA) Incidental Take Permit requirements, the project owner shall transfer fee title or a conservation easement on compensation lands to California Department of Fish and Game (CDFG) under terms approved by CDFG. Alternatively, a Compliance Project Manager-approved, in consultation with CDFG and United States Fish and Wildlife Service (USFWS), non-profit organization qualified pursuant to California Government Code section 65965 may hold fee title or a conservation easement over the compensation lands. In the event an approved non-profit holds title, a conservation easement shall be recorded in favor of CDFG in a form approved by CDFG; in the event an approved non-profit holds a conservation easement over the compensation lands, CDFG shall be named a third party beneficiary.
- The project owner will be required to provide initial enhancement funding and a non-wasting endowment to manage the compensation lands in perpetuity.
- Coordinate with BLM in order to satisfy their requirements in the compensatory mitigation proposal.

Response:

A compensatory habitat mitigation proposal that would mitigate Project impacts to special-status species, including DT, is currently under development as an HMMP. A preliminary draft HMMP will be provided in February 12, 2010. The response provided below summarizes the approach proposed to develop and implement a comprehensive compensatory mitigation plan for impacts to DT, Mohave MGS, and other special-status species.

<u>Introduction</u>

Compensatory mitigation for the RSPP would be achieved through a combination of off-site land acquisition, off-site habitat enhancement, and funding conservation programs that benefit the special-status wildlife species that would be affected by implementation of the Project. The compensatory mitigation approach described in this data response would be further developed and refined in the HMMP to be provided once mitigation lands are selected. Development and refinement of the HMMP would be conducted in close coordination with applicable resource agencies (CDFG, USFWS, BLM and CEC). As noted above, the draft HMMP will be submitted on February 12, 2010; the Applicant will then work with the agencies to refine the draft into a final HMMP.

Land acquisition, preservation, and enhancement through management would be an important component of 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 non-wasting 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 that 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 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.

- *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 protocol-level surveys, MGS habitat assessment, etc.) would be conducted in order 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.

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 non-profit entities known to participate in mitigation planning within the Mojave Desert (e.g., DT Preserve Committee and Wildlands). 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.

<u>Species-specific Habitat Quality Criteria</u>

The following section provides additional detail regarding species-specific habitat quality criteria that would be used to guide selection of off-site mitigation lands in order to satisfy compensatory requirements for the respective species. These species-specific criteria were developed using a regional perspective.

Mojave Desert Tortoise

The suitability of potential off-site 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 amongst critical habitat.
- Existing species occupancy, or likely occupancy based on habitat suitability and occupancy of adjacent lands.

Mohave Ground Squirrel

The suitability of potential off-site 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 DR-BIO-58c and 58d).

Western Burrowing Owl

The suitability of potential off-site 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.

Habitat Mitigation and Monitoring Plan

The HMMP is currently under development. As mentioned above, a preliminary draft HMMP will be provided in February 12, 2010. The Plan would include specific information regarding proposed minimum compensation ratios and criteria for identifying mitigation lands, site-specific mitigation strategies (e.g., preservation versus enhancement options on mitigation lands), implementation of the mitigation approach, and long-term management (including maintenance and monitoring needs) once mitigation lands are selected. As part of the HMMP, an implementation plan would be developed for selected mitigation lands to ensure that the site-specific mitigation strategy is implemented successfully. The implementation plan shall include restoration and/or enhancement needs, associated success criteria, monitoring, adaptive management, and contingency measures.

A long-term management and monitoring plan (LTMP) will also be developed for selected mitigation lands to ensure protection of species-specific habitat values in perpetuity. It is anticipated that a draft LTMP would be provided by October 2010, assuming that mitigation lands have been selected and associated resource assessments completed by this time. The LTMP will describe habitat characteristics of the parcel(s) of land, how the parcel meets the requirements of covered species, and the long-term management (including maintenance and monitoring) needs of the parcel for these species. If the same compensation site(s) is being proposed to satisfy compensatory mitigation needs for multiple species a justification for why the site(s) is acceptable for all species would be included. The LTMP will require annual monitoring reports to be prepared addressing the effectiveness of habitat enhancement(s) and conservation of the mitigation lands acquired to compensate for impacts to covered species. The implementation plan and LTMP could be developed either as part of the HMMP or as separate documents in support of the HMMP. Development and refinement of the HMMP, including the implementation plan and LTMP, will be conducted in close coordination with applicable resource agencies (CEC, CDFG, USFWS, and BLM) to ensure that the compensatory mitigation proposal (HMMP) satisfies each agency's specific mitigation requirements. The HMMP would be subject to the approval of CDFG and USFWS.

As part of the process leading up to the acquisition of compensation lands (i.e., during development of the HMMP), a Property Analysis Record (PAR), or a PAR-like analysis, will be conducted to estimate costs associated with implementation of the mitigation strategy (land acquisition and initial property enhancements) and long-term management and monitoring. The PAR analysis is a commonly used and accepted software tool developed by the Center for Natural Lands Management (2008). 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 will 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 will be an accurate estimate of the long-term endowment costs that would be required to fully implement all compensation measures.

Additionally during the HMMP development, the Project Applicant would provide assurances that the property shall be 1) preserved in perpetuity through the establishment of a conservation easement and identification of an appropriate fee title holder, 2) managed by a reputable land management entity, and 3) fully funded through a non-wasting endowment as described in detail below.

1) *Establishment of Conservation Easement and Identification of Fee Title Holder*

   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 the Desert Tortoise Preserve Committee, Inc. (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, non-profit organization qualified pursuant to California Government Code section 65965 (e.g., DTPC, Inc.; Wildlands, Inc., The Nature Conservancy, etc.). In the event an approved non-profit holds title, a conservation easement shall be recorded in favor of CDFG in a form approved by CDFG; in the event an approved non-profit holds a conservation easement over the compensation lands, CDFG shall be named a third-party beneficiary. The preferred approach is for a qualified non-profit to hold the conservation easement.

2) *Selection of Land Management Entity*

   A land management entity would be selected that will be responsible for managing compensation lands according to the terms of the conservation easement in perpetuity. Therefore, the selected land management entity will be one that is reputable, solvent, and capable of managing the property for its intended purpose (e.g., has a proven track record of land stewardship).

3) *Funding Assurances*

   The Project owner (i.e., Applicant) would be required to provide initial enhancement funding and a non-wasting endowment for the management of compensation lands in perpetuity. The endowment will be necessary to fund long-term management of the property; therefore, the endowment amount must be acceptable to both the selected land management entity tasked with managing the property and the resource agencies. As mentioned above, the amount of the permanent capital endowment would be determined through the PAR or PAR-like analysis. Interest from this amount must 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 lands. The endowment principal cannot be drawn upon unless such withdrawal is deemed necessary by the resource agencies, or the third-party entity approved by the agencies to ensure the continued viability of the species on the properties. The preferred approach is to have the land manager and the endowment holder be the same entity.

Fee Programs

In addition to 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 resulting from the remaining mitigation requirement may be paid to an existing in-lieu fee program or may be donated to a nongovernmental organization (NGO) (e.g., DTPC, Inc., Wildlands, Inc.) and would be designated for specific activities that would promote recovery and/or preservation of the impacted species in the region. Funded activities would occur in proximity to the Project site (within the same County or the same or adjacent watershed), if possible. 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).
- Collaborate with the DTPC to identify high-priority management actions for the protection of DT in Kern County.
- 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 radio-telemetry 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., DTPC, Wildlands, Inc., or other NGO) for management as appropriate.

DR-BIO-73

Information Required:

Please provide a Mohave ground squirrel compensatory habitat mitigation proposal that fully mitigates the proposed impacts of the taking, as described in California Code of Regulations §783.4.

- For compensation lands intended to satisfy CESA Incidental Take Permit requirements, the project owner shall transfer fee title or a conservation easement on compensation lands to CDFG under terms approved by CDFG. Alternatively, a CPM-approved, in consultation with CDFG and USFWS, non-profit organization qualified pursuant to California Government Code section 65965 may hold fee title or a conservation easement over the compensation lands. In the event an approved non-profit holds title, a conservation easement shall be recorded in favor of CDFG in a form approved by CDFG; in the event an approved non-profit holds a conservation easement over the compensation lands, CDFG shall be named a third party beneficiary.
- The project owner will be required to provide initial enhancement funding and a non-wasting endowment to manage the compensation lands in perpetuity.

Response:

Please refer to DR-BIO-72 for a complete response to this data request.

DR-BIO-74

Information Required:

Please provide a copy of completed applications for the California 2081 (Incidental Take Permit) permit and the SAA.

Response:

The Streambed Alteration Agreement application was submitted to Mr. David Hacker of the CDFG on November 25, 2009. A copy of the Streambed Alteration Agreement was provided to the CEC at this time. The California 2081 Incidental Take Permit application will be submitted to the CDFG on February 12, 2010. A copy will be provided to the CEC at the time of submission.

DR-BIO-75

Information Required:

Please provide a Biological Assessment to BLM and USFWS to facilitate completion of the Biological Opinion (Take Authorization) by the USFWS.

Response:

The Biological Assessment will be submitted to the BLM and USFWS on March 1, 2010. A copy will be provided to the CEC at the time of submission.

DR-BIO-76

Information Required:

Please provide a monitoring plan to investigate whether birds are being killed and/or injured from facility operation. The monitoring should last two years unless it can be justified to monitor a shorter or longer period. Carcass removal and searcher efficiency studies should be included as part of the overall monitoring study to identify any biases that need correction. The plan should reflect coordination with the relevant agencies.

Response:

Please refer to Attachment DR-BIO-76, Draft Avian Mortality Plan, provided at the end of this section.

DR-BIO-77

Information Required:

Please provide a relocation plan for desert kit fox. The plan should include a description of the process of closing down dens and a description and discussion of the receiving area and why it is determined to be acceptable. This plan should reflect close coordination with CDFG. The value to kit foxes of potential, known, and natal/pupping dens differ and therefore, each den type needs a different level of protection. When preparing the plan, include the following standard recommendations:

Natal/pupping dens: Natal or pupping dens which are occupied will not be destroyed until the pups and adults have vacated. Therefore, project activities at some den sites may have to be postponed.

Known Dens: Known dens occurring within the footprint of the activity must be monitored for three days with tracking medium or an infra-red beam camera to determine the current use. If no kit fox activity is observed during this period, the den should be destroyed immediately to preclude subsequent use. If kit fox activity is observed at the den during this period, the den should be monitored for at least five consecutive days from the time of the observation to allow any resident animal to move to another den during its normal activity. Use of the den can be discouraged during this period by partially plugging its entrances(s) with soil in such a manner that any resident animal can escape easily. Only when the den is determined to be unoccupied may the den be excavated under the direction of the designated biologist. If the animal is still present after five or more

consecutive days of plugging and monitoring, the den may have to be excavated when, in the judgment of the Designated Biologist, it is temporarily vacant, for example during the animal's normal foraging activities. Hand excavation is encouraged, but it is realized that soil conditions may necessitate the use of excavating equipment. However, extreme caution must be exercised.

Destruction of the den should be accomplished by careful excavation until it is certain that no kit foxes are inside. The den should be fully excavated, filled with dirt and compacted to ensure that kit foxes cannot re-enter or use the den during the construction period. If at any point during excavation a kit fox is discovered inside the den, the excavation activity shall cease immediately and monitoring of the den as described above should be resumed. Destruction of the den may be completed when in the judgment of the Designated Biologist the animal has escaped from the partially destroyed den.

Potential Dens: Potential dens should be monitored as if they were known dens.

Response:

Please refer to Attachment DR-BIO-77, Draft Desert Kit Fox Relocation/Translocation Plan, provided at the end of this section.

DR-BIO-78

Information Required:

Please provide a detailed enhancement plan for desert kit fox receiving area and discuss why these measures will increase the likelihood of a successful desert kit fox relocation effort.

Response:

If kit foxes are translocated, they would be moved to receiving sites with suitable habitat sufficient to support all translocated animals. Therefore, no additional habitat enhancement is proposed.

Attachment DR-BIO-53

Regional and Local DT Connectivity

Kings County
Tulare County
Inyo County
Project Location
Ridgecrest
Oildale
Kern County
Lamont
Arvin
San Luis Obispo County
Tehachapi
Rosamond
Santa Barbara County
Lancaster
Palmdale
Victorville
Santa Clarita
Ventura County
Los Angeles County
Hesperia
San Bernardino County
Twentynine Palms
Desert Hot Springs
Los Angeles
Los Angeles County
Riverside County
Orange County
Orange County
San Diego County
Oceanside
Escondido
Encinitas
Imperial County
California
Arizona

Map Location

Legend

- Project Area
- Desert Tortoise Critical Habitat (USFWS)
- WEMO DWMA

Source: ESRI; USFWS; BLM; AECOM

N
W
E
S

1 inch = 24 miles

0 24 48 Miles

Ridgecrest Solar Power Project
Responses to 12/22/09
Data Request

DR-BIO-53-1
Regional and Local DT Connectivity

Solar Millennium

AECOM

Date: January 2010

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Attachment DR-BIO-54

Draft Desert Tortoise Clearance and Relocation/Translocation Plan

DRAFT
RIDGECREST SOLAR POWER PROJECT
DESERT TORTOISE CLEARANCE AND RELOCATION/TRANSLOCATION PLAN

Prepared for:

Ridgecrest Solar I, LLC
1625 Shattuck Ave, Suite 270
Berkeley, CA 94709

Prepared by:

AECOM
Contact: Leo Edson
Phone: (916) 414-5800

January 2010

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DR-BIO-54-A Guidelines for Desert Tortoise Translocation (USFWS 1994)

DR-BIO-54-B Recommended Specifications for Permanent Desert Tortoise Exclusion Fence

DR-BIO-54-C Clearance Survey Protocol for the Desert Tortoise – Mojave Population

DR-BIO-54-D Guidelines for Handling Desert Tortoise During Construction Projects

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Figure DR-BIO-54-1 Regional Map

Figure DR-BIO-54-2 Vegetation Communities

Figure DR-BIO-54-3 Desert Tortoise Observations

Figure DR-BIO-54-4 Project Site Relative to the West Mojave Plan (WEMO) Desert Wildlife Management Area and Desert Tortoise Critical Habitat

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I. INTRODUCTION

Ridgecrest Solar I, LLC (or Applicant) proposes to construct, own, and operate the Ridgecrest Solar Power Project (RSPP or Project). The Project would have a nominal output of 250 megawatts (MW) and consist of a single power plant utilizing two solar fields.

The RSPP site (Project site) is located in the high northern Mojave Desert in northeastern Kern County, about 5 miles southwest of the City of Ridgecrest, California (Figure DR-BIO-54-1). The Project right-of-way (ROW), for which the Applicant has applied to the Bureau of Land Management (BLM), includes approximately 3,995 acres of public lands owned by the Federal government and managed by BLM. Lands within the Project ROW are primarily undeveloped open space dominated by Mojave creosote bush scrub vegetation (Figure DR-BIO-54-2). 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 offsite.

Protocol surveys for desert tortoise (*Gopherus agassizii* [DT]), a State and federally listed threatened species, were conducted from March 7 through May 28, 2009, and on October 26, 2009. Surveys were conducted throughout the Project disturbance area and in the buffer area (i.e., along transects forming a 1,000-foot buffer around proposed Project linear features and a 0.75-mile and 1-mile buffer around remaining non-linear Project features, as required by the California Energy Commission [CEC]). A total of 40 DT were detected in the Project disturbance area and 11 were found in the buffer area. Additional DT sign (burrows, pallets, scat, tracks, carcasses, and shell remains) was also observed throughout the Project disturbance area and in portions of the buffer.

Implementation of the proposed Project has the potential to adversely affect the State and federally listed DT. Incidental take authorization of DT must be obtained prior to implementation of the Project to comply with the Federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA). Relocation or translocation of DT from the Project footprint is anticipated and is a requirement of both the ESA and CESA incidental take permits.

This Desert Tortoise Relocation Plan/Translocation (Plan) has been prepared on behalf of the Applicant and outlines the methods that would be used to protect DT within the Project disturbance area and move DT out of harm's way prior to the onset of construction activities. Moving DT would include either simply removing DT a short distance to another part of their home range (relocation), which is preferred by the Applicant, or moving DT outside their home range to suitable conservation areas away from the Project (translocation). This Plan also identifies measures that would be implemented for the maintenance, monitoring, reporting and management of the DT and the relocation/translocation land.

To reduce impacts on sensitive biological resources, the Project site plan was reconfigured to minimize impacts to the El Paso Wash, increase connectivity for the Mohave Ground Squirrel (MGS), and to reduce the impact to DT. The Project description, including acreage calculations,

presented below are based on the reconfigured site plan. However, survey results presented in this report are based on surveys conducted in 2009, prior to site redesign. Additional biological surveys will be conducted in spring 2010, after the site plan has been finalized, to ensure that all sensitive biological resources in the new Project footprint have been accurately identified and quantified. Following completion of spring 2010 surveys, impacts to sensitive biological resources will be updated and environmental compliance documents will be revised as appropriate. The Project mitigation will be developed based on the revised impact calculations.

II. BACKGROUND

A. Project Description

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 3000 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 a total of approximately 1,944 acres on site plus 16.3 acres offsite 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 (MW) solar energy facility on approximately 1,448 acres (Plant Site). 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, on-site 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 will be used to fire an auxiliary boiler overnight to support startup operations until the HTF system is up to operating temperature, at which time the generation of electricity can commence. A second fired heater will 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 12" diameter or smaller depending on the Water District's determination.) A new 230- kV transmission line from the turbine generator to a new nearby switchyard will interconnect with SCE's existing 230-kV InyoKern/Kramer Junction transmission line located west of the Project site.

B. Desert Tortoise Survey Results

A total of 51 DT were observed within the Project disturbance area and buffer, combined (i.e., biological resources study area [BRSA]) during focused surveys for DT conducted March 7 through May 28, 2009, and October 26, 2009 (AECOM 2009) and incidentally during other biological surveys in 2009. Surveys completed on October 26, 2009 were conducted within the water pipeline disturbance area a subset of the Project disturbance area, and associated buffer because the water pipeline route had not yet been finalized in spring 2009 (March 7 through May 28). Forty DT detections (including 23 adults) occurred within the Project disturbance area. Of all detections within the BRSA, 30 were adult DT, 12 were juveniles, and 9 were of unknown age. Over 200 DT burrows and 33 pallets were observed throughout the BRSA and are mapped in Figure DR-BIO-54-3. Twenty-three burrows were occupied by DT; 48 burrows were noted as active (exhibiting evidence of recent use by DT). Thirty-six of the active burrows and 18 of the occupied burrows were within the Project disturbance area. In addition, the following DT sign was observed within the Project disturbance area: four active DT pallets, 23 additional DT pallets, 99 observations of scat (12 of which were fresh), eight observations of bone fragments,

and five carcasses (2 of which were adults). DT tracks were common within active DT burrows. Figure DR-BIO-54-3 shows the location of DT and DT sign observed during the surveys conducted at the Project site.

The RSPP site is not located in DT critical habitat, nor is it located within any of the four DT Desert Wildlife Management Areas (DWMAs) designated for DT conservation under the West Mojave (WEMO) Plan (Figure DR-BIO-54-4). The nearest DWMA is the Fremont-Kramer DWMA, located approximately 7 miles south of the site. A total of 844 acres of the Project disturbance area (south of Brown Road) occurs within the MGS Conservation Area, a Wildlife Habitat Management Area designated by the WEMO (BLM 2005). The site is not located within any other WEMO-designated conservation areas.

III. PLAN GOALS

The goals of these relocation/translocation efforts are to:

- Successfully relocate at-risk DT to suitable habitat located adjacent to the Project site;
- If relocation is not feasible, successfully translocate at-risk DT from the Project site to selected translocation site(s);
- Minimize impacts of relocation to resident DT outside the Project site;
- Minimize the impacts of translocation on recipient DT populations; and
- Collect monitoring data to enhance understanding of translocation as a viable conservation technique, to ensure DT safety and evaluate success of relocation/translocation efforts, and to guide adaptive management to improve effectiveness of relocation/translocation.

IV. RELOCATION/TRANSLOCATION PLAN

This relocation/translocation plan meets the requirements of the Translocation Guidelines specified in Appendix B of the Desert Tortoise Recovery Plan (USFWS 1994). This Plan has also incorporated the interim guidelines set forth by the California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USFWS) for the translocation of DT (LaPre, pers. comm. 2010). New techniques and requirements are currently in development by the USFWS and will be incorporated as they are received. Once this Plan meets BLM approval, it will be submitted as part of the overall proposed action to USFWS for consideration in USFWS's issuance of a biological opinion (BO). The BLM also will seek CDFG concurrence with this Plan prior to initiating formal consultation Section 7 with the USFWS. Final guidance provided in the Project BO will be incorporated into this Plan.

Relocation/translocation of DT would be necessary prior to the start of Project construction. The USFWS defines "translocation" as when a DT must be moved more than 5 kilometers (km) to clear it from the Project site, which typically removes the DT out of their home range, while "relocation" requires a movement of less than 5 km. Relocation, the preferred option, would be

used to move as many of the DT as possible. DT that need to be relocated from the Project disturbance area would be placed outside the Project disturbance area but would be placed in suitable habitat as close to the capture location as possible. However, translocation of DT further than 5 km may be necessary because of potential DT density constraints on land adjacent to the Project site. An evaluation of carrying capacity is planned to determine the appropriate number of DT to relocate on land adjacent to the Project site.

All relocation/translocation efforts would be carefully implemented to avoid adverse health impacts to the DT and to minimize adverse impacts to DT or receiving DT populations. In order to maximize relocation/translocation success, Project construction activities must be closely coordinated with appropriate DT clearance surveys, handling procedures, environmental considerations such as ambient temperature, animal health screening, and relocation/translocation scheduling. These are discussed in detail in the following sections. If any DT mortality is suspected as a result of any relocation/translocation activities described in this Plan, CDFG will be notified immediately.

A. Site Considerations and Options for Relocation

As indicated earlier, DT that are relocated from the Project footprint would be placed outside the footprint, but within the RSPP ROW.

If practical, DT detected during pre-construction surveys would not be "translocated" in the biological sense of putting an animal in a location outside their home range. Instead, DT would simply be moved to another part of their home range (i.e., relocated). By moving a DT found near the site's border abutting native vegetation to a suitable location immediately adjacent to its capture site outside the Project disturbance area, the Project would be maintaining the DT within its home range, not translocating it. For the transmission line and fence construction, DT would be moved a short distance from the construction zone. If a DT is detected in the middle of the Project site or if moving a DT would entail more than a 5-km move, then such an individual would be considered for translocation (see Section B, Site Considerations for Translocation).

As evident from Figure DR-BIO-54-2, the majority of the BSRA outside the Project disturbance area considered for potential relocation of DT consists of Mojave creosote bush scrub habitat, a suitable habitat to relocate DT. In general, the eastern portion of the BSRA and ROW is unsuitable for relocation, particularly to the north of Brown Road, where the presence of U.S. Highway 395 and scattered residential development pose a constraint. DT found in the western portion of the Project site would be relocated to suitable areas in the western BSRA or ROW. Similarly, DT found in the southern portion of the Project site would be relocated south. No DT from north of Brown Road would be relocated south of Brown Road and vice versa. All other DT would be translocated unless other mitigation measures (e.g., fencing Brown Road and Highway 395) are able to be implemented to ensure that relocated DT would be safe. Even DT relocated within their home range are likely to travel more when their home range is restricted by the Project fence and may be killed on U.S. Highway 395 or Brown Road. In all cases, DT would be relocated to suitable areas, as close as safely possible to the capture site.

The specific selection of relocation site(s) will be determined prior to the initiation of construction activities. Once preliminary relocation areas are determined based on "desktop" analysis, these areas will be surveyed prior to implementing relocation activities to determine the distribution of resident DT. The results of these surveys will be used to determine, in consultation with Dr. Karl and the agencies, whether the area would be suitable for the relocation of DT (e.g., area below the carrying capacity for DT).

Once further site(s) suitability has been determined, the location(s) and supporting information will be coordinated with USFWS, CDFG, and BLM to obtain their concurrence. A number of factors will be taken into consideration in determining the relocation sites; one of the primary considerations will include habitat suitability. The relocation site(s) will be composed of DT habitat that resembles the habitat on the Project site or possesses the best attributes for the survival of the DT. Analysis of the habitat will also consider precipitation, soils, vegetation community, vegetation density and abundance, perennial plant cover, forage species, geomorphology, and slope. The safety of the site(s) for DT, in relation to other existing land use features, such as roadways, will also be considered. For instance, U.S. Highway 395 east of the RSPP site would pose a risk to DT disturbed by the loss of habitat at the site, in combination with relocation.

In all instances, DT would be released into the deep shade of a large shrub, a known burrow for that DT, or an unoccupied natural or artificial burrow within the identified receiving area; and subsequently monitored by the biological monitor (BM; refer to Section C, Qualifications of Authorized Handlers, for a definition) with oversight by the authorized biologist (AB; also refer to Section C for a definition). Circumstances under which each option for release is considered appropriate will be determined in collaboration with the resource agencies. In cases where DT are relocated into an unoccupied natural or artificial burrow within the identified receiving area, the receiving burrow would be of the same size and orientation as the original burrow. The final determinations on placement of relocated DT would take place as a result of pre-construction clearance surveys in the Project disturbance area.

Site Considerations for Translocation

At this time, potential translocation site(s) have not been identified. Any considered translocation site and/or required compensatory habitat selection designed to fulfill permit conditions would be based on maximizing translocated animal survivorship and long-term conservation planning pertinent to all aspects of the Project. Various planning, geographic and administrative factors and tools, such as GIS, would be considered in potential translocation site(s) selection.

The USFWS has issued translocation guidelines for the Ivanpah Solar Energy Project, and based on these guidelines, is now preparing to issue new guidelines that would apply to all utility-scale solar projects (LaPre, pers. comm., 2010). These guidelines are being prepared by the Desert Tortoise Recovery Office in Reno. The RSPP team will contact the Desert Tortoise Recovery Office to obtain a copy of these new guidelines when they are available and incorporate the guidelines into the Project translocation planning and efforts.

B. Qualifications of Authorized Handlers

The USFWS (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt) assigns a single designation for biologists who can be approved to handle DT - AB. Such biologists have demonstrated to USFWS that they possess sufficient DT knowledge and experience to handle and move DT appropriately. The AB is permitted to then approve specific monitors to handle DT, at their discretion. The CDFG must also approve such biologists, potentially including individual approvals for monitors approved by the AB. Although the CEC only has designations for "Designated Biologist" and BM, only the biologists (AB or other appointed monitors) authorized by USFWS and CDFG can handle DT.

An AB would be the responsible for directing the overall RSPP translocation/relocation program, including the clearance surveys, monitoring and reporting. The BM would assist the AB in other aspects of relocation/translocation program, as necessary. The primary responsibility of the BM would be monitoring construction activities, such as fence installation.

C. Consistency with Plans and Permits

At the time of the development of this Plan, application packages to procure incidental take permits pursuant to CESA and ESA, respectively, are being prepared and submitted to the regulatory agencies. All relocation/translocation techniques to be used per this Plan would adhere to terms and conditions specified in the State (Section 2081) and Federal (BO) incidental take permits, as well as the applicable finalized CEC Conditions of Certification, once they are obtained.

A number of guidelines and sources of information have provided primary direction for all relocation/translocation plan elements described in this document. Handling of DT and other DT protection measures would be conducted in accordance with the USFWS-approved protocols (DTC 1994; USFWS 2009). The techniques and translocation site options recommended herein are intended to be consistent with all pertinent regulatory plans developed for long-term conservation of the DT and specific permits issued for this Project. In addition, all actions discussed are based upon ecological considerations and information gleaned from previous DT translocations and translocation plans. This Plan has also been developed under the technical guidance of Dr. Alice Karl, who also shared documents that were incorporated into this Plan. Off-site translocation procedures identified in this document are based on established Translocation Guidelines prescribed in the Desert Tortoise Recovery Plan (USFWS 1994, Attachment DR-BIO-54-A) and will be modified as necessary; based on project-specific USFWS recommendations, including a new DT field manual currently in preparation.

D. Site Fencing

To facilitate DT relocation/translocation and exclusion, permanent DT exclusion fencing would be installed around the perimeter of the solar fields, power block and adjacent support structures prior to initiating DT relocation/translocation. External linear facilities and El Paso Wash would not be fenced. Site fencing would ensure that other DT do not enter the active construction areas. DT that utilize habitats proximal to the Project's linear utility features would also be excluded from

potential impact and/or removed from harm's way should they approach an active construction zone. Temporary fencing would be installed prior to clearance surveys around any initial construction startup/primary staging areas, in portions of linear utilities, and in any other areas where ground disturbance would occur outside permanent DT-proof fencing as a result of the Project to exclude DT from this area.

Prior to translocation/relocation activities, the boundary of the unit being developed would be permanently fenced with an 8-foot-high chain link fence for security purposes. Permanent DT exclusionary fencing would either be attached to the base of the security fence or installed just outside of this security fence. Both permanent and temporary fences involve the installation of 3-foot wide, 1-by-2 inch mesh hardware cloth, situated at 24 inches above ground, with 12 inches of material buried. Specifications for DT-proof fencing are provided in Attachment DR-BIO-54-B and can be found at the following website: http://www.fws.gov/ventura/sppinfo/protocols/DT Exclusion-Fence 2005.pdf. For temporary exclusion fences, rebar would be used to secure hardware cloth material every 4 to 5 feet. All fencing would be constructed with durable materials (i.e., 11 gauge or heavier) suitable to resist desert environments, alkaline and acidic soils, wind, and erosion.

All DT-exclusion fence installation activities (permanent and temporary) would be overseen and monitored by qualified BMs. The AB would be available at all times to move any DT that are within the path of the fence line work. After installation, all fencing would be monitored by the BM at least monthly as well as during storms and after high-wind events. Temporary fencing would be monitored at least weekly. Sand and debris would be removed as necessary. Repairs would be made immediately.

E. Clearance Surveys

A clearance survey for any DT that may be on the Project site will be conducted throughout the Project disturbance area. The timing of the clearance survey will coincide with heightened DT activity, from April through May or September through October. This will maximize the probability of finding all DT.

All clearance surveys will be performed per USFWS protocol guidelines (USFWS 2009). A copy of the guidelines is provided in Attachment DR-BIO-54-C. The AB would be primarily responsible for the clearance surveys and would be assisted by the BM and other qualified biologists with experience in conducting clearance surveys. Transect spacing between monitors would be appropriate for the vegetation present in the clearance area, but no greater than 5 meters apart. All DT sign encountered during clearance surveys would be recorded on standard forms (USFWS 1992) and studied for its possible indication of DT presence.

Within 24 hours prior to the initiation of construction of the DT-exclusion fence (permanent or temporary), a clearance survey would be conducted using techniques providing 100-percent coverage of the construction area and an additional transect along both sides of the fence line to provide coverage of an area approximately 90-feet wide centered on the fence alignment. Transects

would be no greater than 30 feet apart. A minimum of two clearance passes of complete coverage would be conducted. Any DT or potential DT burrow along and inside the fence line would be mapped for monitoring during fence construction, and the current use (e.g., occupied or unoccupied) would be identified.

After the area to be cleared is fully enclosed with DT-exclusion fencing, a DT clearance survey would be performed. A minimum of two clearance passes with complete coverage would be conducted as described above. Each separate survey would be walked in a perpendicular direction or offset transects to allow different angles of observation. If no DT are observed during the second survey, a third survey would not be conducted. If a DT is located on the second survey, a third survey would be conducted.

Once the area inside DT-exclusion fencing is deemed free of DT after at least two consecutive clearance surveys then heavy equipment would be allowed to enter the construction site to perform earth work such as clearing or cutting vegetation, grubbing, leveling, and trenching. The BM would monitor initial clearing and grading activities to find and relocate any DT missed during the initial DT clearance survey. Should a DT be discovered, then the AB would be responsible for relocating it outside the fence or arranging translocation.

F. Desert Tortoise Handling

All DT handling and removal, and burrow excavations, including nests, would be conducted under the supervision of the AB, in accordance with the USFWS approved protocols contained in the Desert Tortoise Council's "Guidelines for Handling Desert Tortoises during Construction Projects" (DTC 1994, rev. 1999) that incorporate the most recent, pertinent research data (Brown 2003). A copy of these Guidelines is provided in Attachment DR-BIO-54-D of this document. Any burrow that could potentially host a DT will be excavated with hand tools per the method prescribed under these Guidelines. In general, it is recommended that DT not be handled when the air temperature exceeds 90°F at 1.5 meters above the ground or if the ground temperature exceeds 95°F (DTC 1994, rev. 1999).

For relocation/translocation, each DT will be transported via an individual, sterilized tub with a taped, sterilized lid. Containers may be reused only after being disinfected with a 10-percent bleach solution and dried. Every effort will be made while handling DT to release each animal within 30 minutes of its capture. Except during brief (e.g., one-minute) periods when plastron measurements, weighing and photographs are taken, animals will be kept in an upright position.

When live DT are transported by vehicle, a means of cushioning the DT will be used to minimize jarring, bumping, and sliding. DT will not be placed in automobile trunks, on floorboards in an unconfined manner, in the bed of a truck over the exhaust system, or left unattended in vehicles. Transport by vehicle will involve only designated open routes, with speeds limited to 25 miles per hour on dirt or gravel roads.

DT observed on Project site utility corridors (e.g., water pipeline or transmission line) during Project operations and maintenance activities would not be disturbed or handled and would be allowed to move away of their own accord. Any maintenance that required surface disturbance or heavy equipment would require the same protection measures as for construction.

G. Data Gathering

The AB, with assistance from qualified biologists, would maintain a record of all DT encountered and relocated/translocated during Project surveys and monitoring. This information would include for each individual DT: the location (narrative, vegetation type, and maps) and dates of observations; burrow data; animal gender, carapace length, mass, and clinical signs of disease (discussed further in Subsection I); whether the animal voided its bladder; any apparent injuries and state of healing; and diagnostic markings (i.e., identification numbers). All DT handled would be photographed. Processing of DT found during the clearance surveys would be done the day of capture in an appropriate facility to provide shade, should temperatures require. Other options for a processing facility may be the use of temporary shade structures (e.g., E-Z Ups) or a temperature-controlled facility (e.g., a recreational vehicle).

H. Animal Health Considerations

Several diseases have been documented in wild DT populations. These include an upper respiratory tract disease (URTD) commonly associated with *Mycoplasma agassizii* (Rostal and Lance 2003); a similar disease complex connected to *Mycoplasma testudinium* and proliferative pneumonia (Jacobson and Berry 2004); a cutaneous dyskeratosis shell disease (Christopher et al. 2003); and a herpes virus (Origgi et al. 2002).

URTD and similar complexes are likely exacerbated by stress, which can be imposed on DT by drought, habitat degradation, poor nutrition and/or animal density (Saethre et al. 2003). It is also likely that certain levels of stress predispose DT to acquiring one or more of these diseases.

It is conceivable that the stress of translocation may either exacerbate existing disease or immunocompromise such that an animal contracts disease more easily. Other diseased animals must, however, be in the translocation area for healthy translocated DT to become infected.

M. agassizii transmission involves direct contact with an infected DT (Brown et al. 2003). DT are believed to be contagious during periods of acute phases, when they have clinical signs (Brown et al. 2003). Such signs include a mucous nasal discharge, wheezing, conjunctivitis, and lethargy.

All DT handled as part of this Plan will be examined for clinical signs of URTD symptoms, visible signs of herpes lesions and cutaneous dyskeratosis (Berry and Christopher 2001), with data recorded for each animal. Verified ill DT would not be placed in situations where contagion can spread to healthy DT. The AB will remove and quarantine any DT that requires translocation and shows clinical signs of disease. The AB will subsequently contact the USFWS within 24 hours to determine appropriate actions for these individuals. DT that are relocated would not require additional health assessments prior to relocation.

V. ANIMAL MONITORING AND REPORTING

All DT moved, whether during initial fence construction, from the Project site, during construction for linear facilities, or later, will be monitored sufficiently to ensure their safety and to evaluate the effectiveness of relocation/translocation efforts. Closely monitoring DT condition and movements after relocation/translocation could also facilitate the identification of potential problems at the selected receiving site and would inform an adaptive management approach for ensuring relocation/translocation success. Monitoring would also enhance the understanding of relocation/translocation as a viable conservation technique for this species. Specific monitoring, adaptive management, and reporting requirements for relocation and translocation will be developed in close coordination with resource agencies and would address, at a minimum, the following elements:

- success criteria for effective relocation/translocation,
- monitoring metrics and approach,
- thresholds for adaptive management action (e.g., management triggers),
- appropriate adaptive management actions, and
- reporting frequency

VI. PROGRAM CONTACTS

The following is a list of agency staff that will be contacted as applicable, on various aspects of relocation/translocation site selection, and long-term management of the translocation site(s):

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VII. LITERATURE CITED

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Ridgecrest Solar Power Project Responses to 12/22/09 Data Requests

Figure DR-BIO-54-1 Regional Map

Source: ESRI; AECOM 2009

Solar Millennium

AECOM

Date: January 2010

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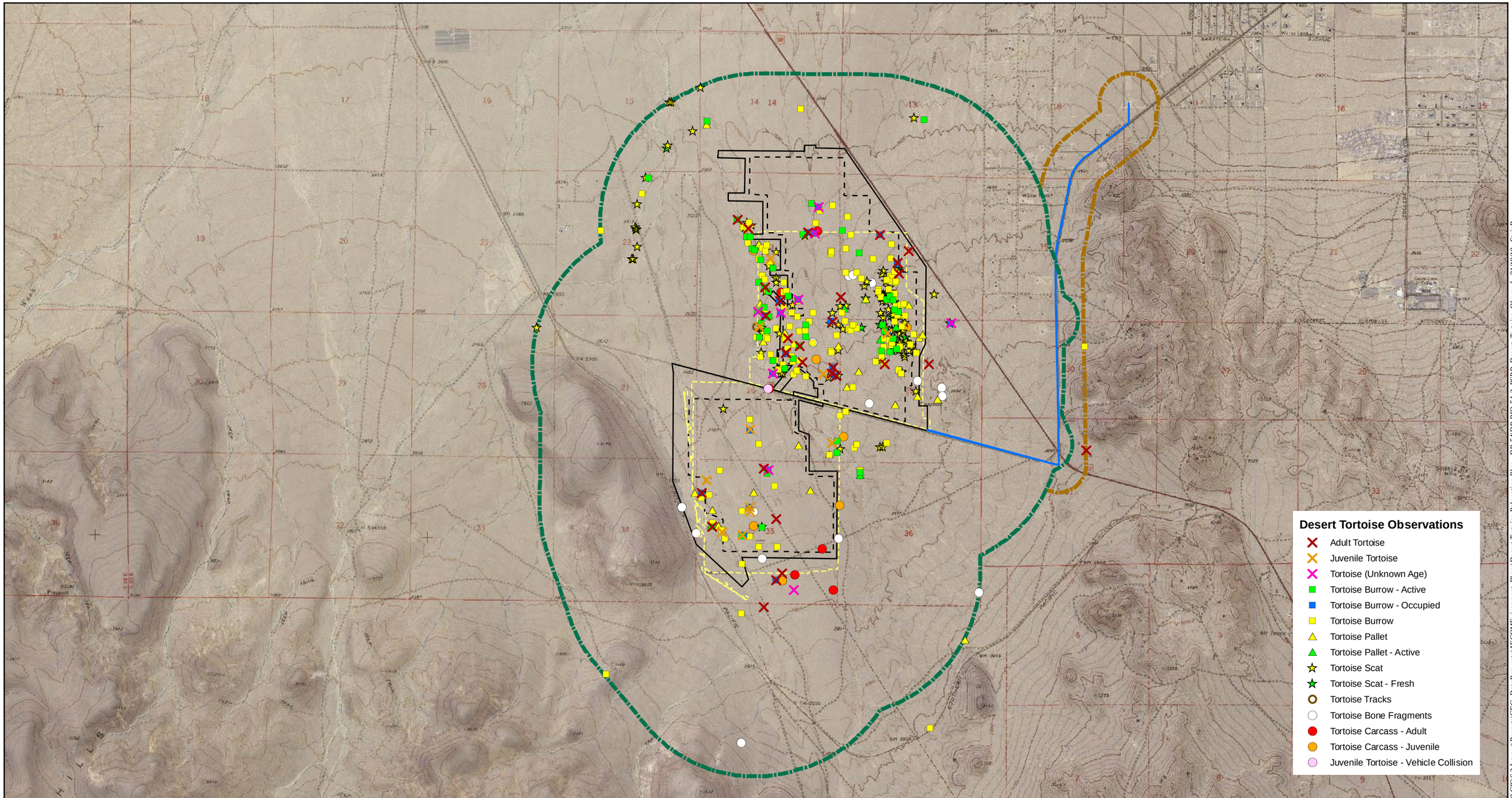

Map Location

Legend

Biological Resources Survey Area (BRSA)

- Spring 2009 Survey
- Fall 2009 Survey
- Facility Footprint
- Reconfigured Disturbance Area
- Water Line Disturbance Area
- Surveyed Disturbance Area

Source: NAIP 2005; AECOM 2009

N W E S

1 inch = 3,500 feet

0 3,500 7,000 Feet

Ridgecrest Solar Power Project
Responses to 12/22/09
Data Request

Figure DR-BIO-54-3
Desert Tortoise Observations

Solar Millennium

AECOM

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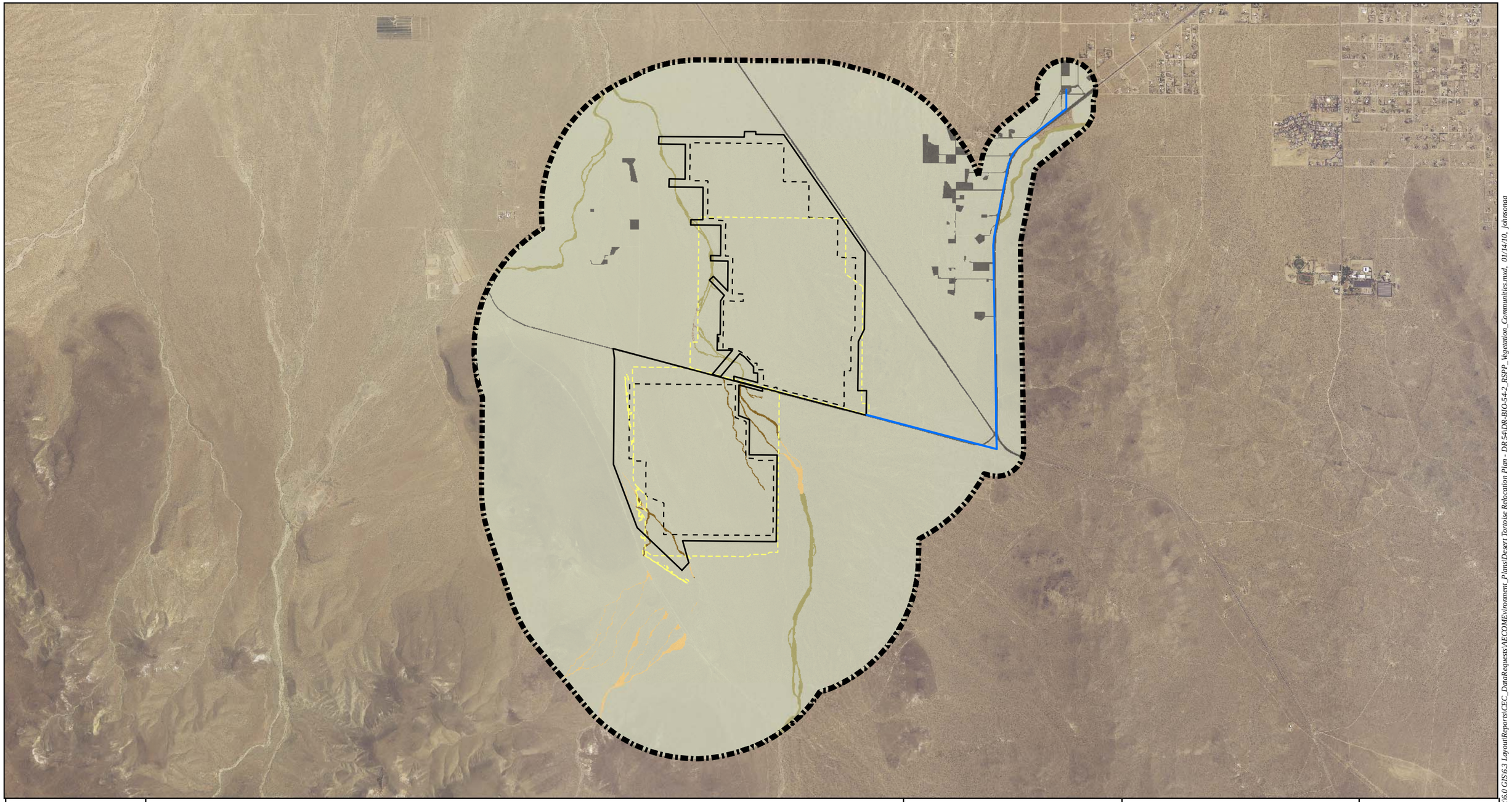

Map Location

Legend

- Surveyed Biological Resources Survey Area (BRSA)
- Facility Footprint
- Reconfigured Disturbance Area
- Water Line Disturbance Area
- Surveyed Disturbance Area

Vegetation Communities

Riparian

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

Upland

- Mojave Creosote Bush Scrub

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
Responses to 12/22/09
Data Request

Figure DR-BIO-54-2
Vegetation Communities

Solar Millennium

AECOM

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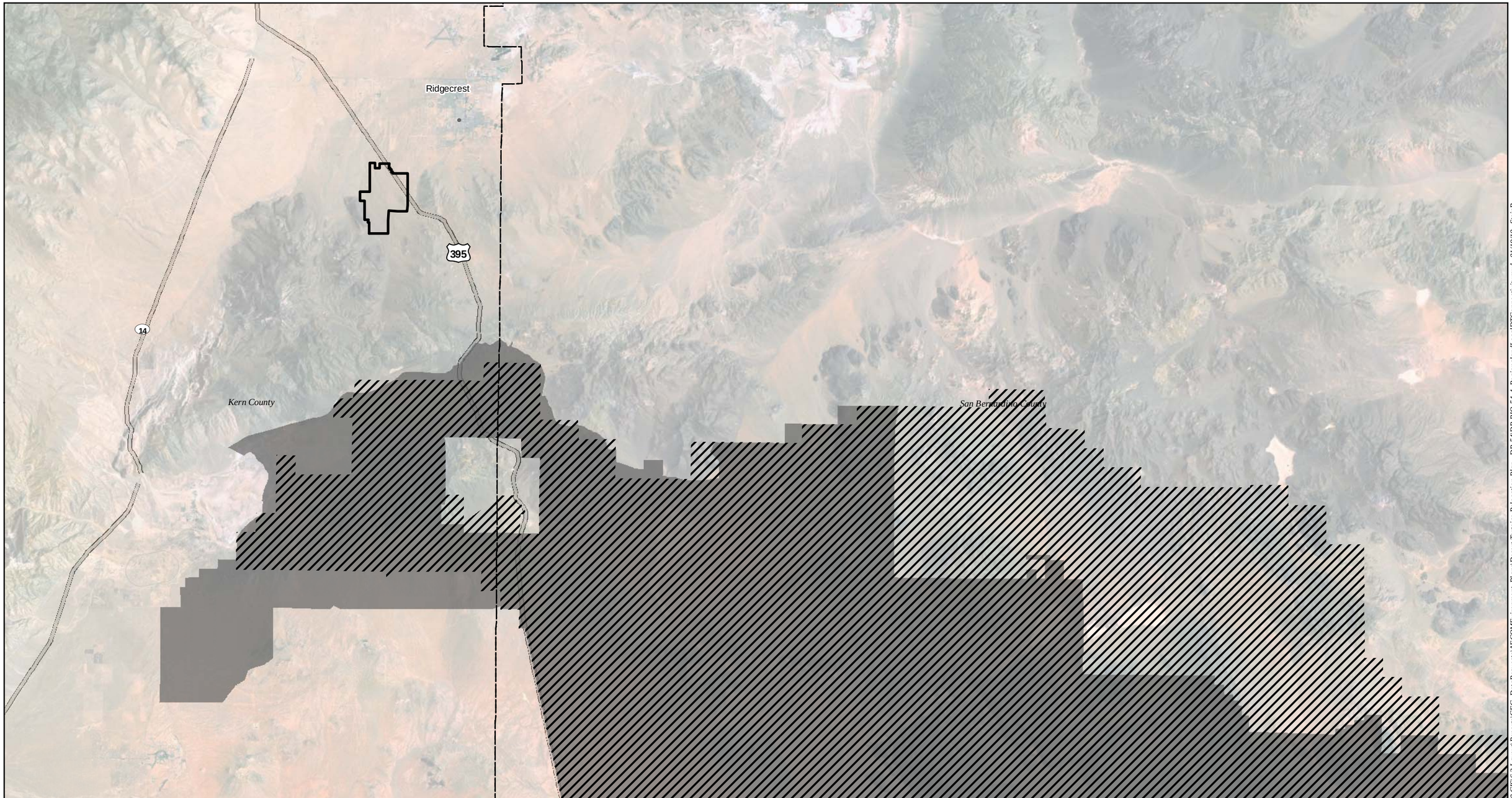

Map Location

Legend

- Project Area
- Desert Tortoise Critical Habitat (USFWS)
- WEMO DWMA

Source: ESRI; USFWS; BLM; AECOM

N
W E
S

1 inch = 5 miles

0 5 10 Miles

Ridgecrest Solar Power Project
Responses to 12/22/09 Data Request

DR-BIO-54-4
Project Site Relative to the
West Mojave Plan (WEMO)
Desert Wildlife Management Area
and Desert Tortoise Critical Habitat

Solar Millennium

AECOM

Date: January 2010

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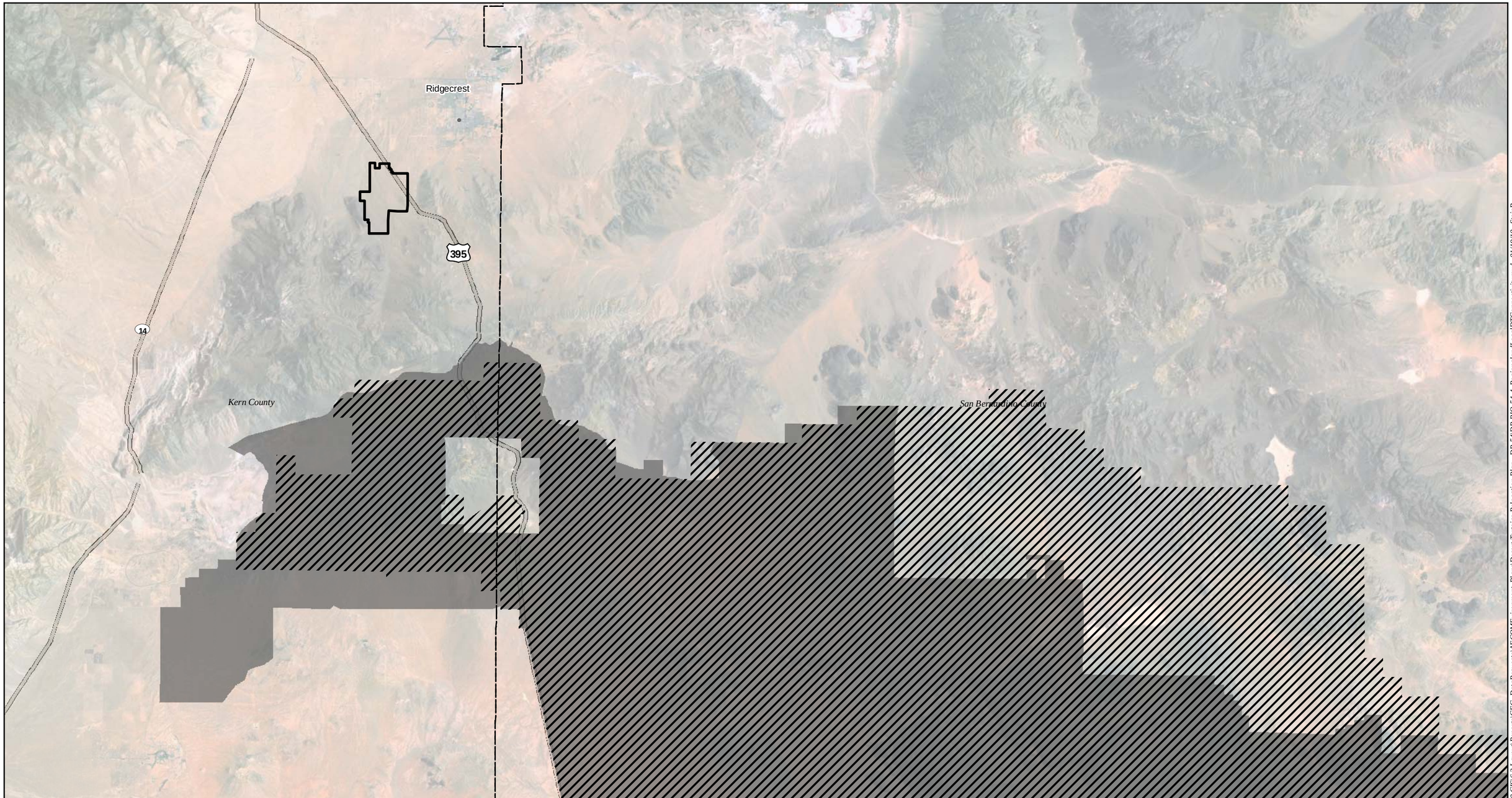
FIGURE DR-BIO-54-4

PROJECT SITE RELATIVE TO THE WEST MOJAVE PLAN (WEMO) DESERT WILDLIFE MANAGEMENT AREA AND DESERT TORTOISE CRITICAL HABITAT



Map Location

Legend

- Project Area
- Desert Tortoise Critical Habitat (USFWS)
- WEMO DWMA

Source: ESRI; USFWS; BLM; AECOM

N
W E
S

1 inch = 5 miles

0 5 10 Miles

Ridgecrest Solar Power Project
Responses to 12/22/09 Data Request

DR-BIO-54-4
Project Site Relative to the
West Mojave Plan (WEMO)
Desert Wildlife Management Area
and Desert Tortoise Critical Habitat

Solar Millennium

AECOM

Date: January 2010

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ATTACHMENT DR-BIO-54-A

GUIDELINES FOR DESERT TORTOISE TRANSLOCATION (USFWS 1994)

Appendix B: Guidelines for Translocation of Desert Tortoises

(1) Experimental translocations should be done outside experimental management zones. No desert tortoises should be introduced into DWMAs—at least until relocation is much better understood.

(2) All translocations should occur in good habitat where the desert tortoise population is known to be substantially depleted from its former level of abundance. Translocation of reproductively competent adults into depopulated areas can have beneficial effects on population growth. Before population growth can occur, however, individuals must establish home ranges and enter into any existing social structure. Desert tortoises should be periodically evaluated against a defined health profile (proportional weight/size, fecal scans, and blood panels).

(3) Areas into which desert tortoises are to be relocated should be surrounded by a desert tortoise-proof fence or similar barrier. The fence will contain the desert tortoises while they are establishing home ranges and a social structure. If the area is not fenced, past experience suggests that most animals will simply wander away from the introduction site and eventually die. (Fencing is not cheap; estimates range from $2.50 to $5.00 per linear foot). Once animals are established some or all of the fencing can be removed and probably reused.

(4) The best translocations into empty habitat involve desert tortoises in all age classes, in the proportions in which they occur in a stable population. Such translocations may not always be possible, since young desert tortoises are chronically underrepresented in samples, often due to observer sampling error, and may now actually be underrepresented in most populations due to poor recruitment and juvenile survivorship during the last several years. Desert tortoises smaller than the 7-year age-size class are particularly vulnerable to predation and may be a poor investment for translocation, unless predator exclusion (fencing, for example) is incorporated into such endeavors. Mature females would probably be the best sex/age class to introduce into below carrying capacity extant populations because of their high reproductive value (low potential mortality, high potential fecundity for many years).

(5) The number of desert tortoises introduced should not exceed the pre-decline density (if known). If the pre-decline density is not known, introductions should not exceed 100 adults or 200 animals of all age classes per square mile in category 1 habitat (Bureau of Land Management designation for management of desert tortoise habitat) unless there is good reason to believe that the habitat is capable of supporting higher densities. Post-introduction mortalities

might be compensated by subsequent introductions if ecological circumstances warrant this action.

(6) All potential translocatees should be medically evaluated in terms of general health and indications of disease, using the latest available technology, before they are moved. All translocatees should be genotyped unless the desert tortoises are to be moved only very short distances or between populations that are clearly genetically homogeneous. All translocated animals should be permanently marked, and most should be fitted with radio transmitters so that their subsequent movements can be closely tracked.

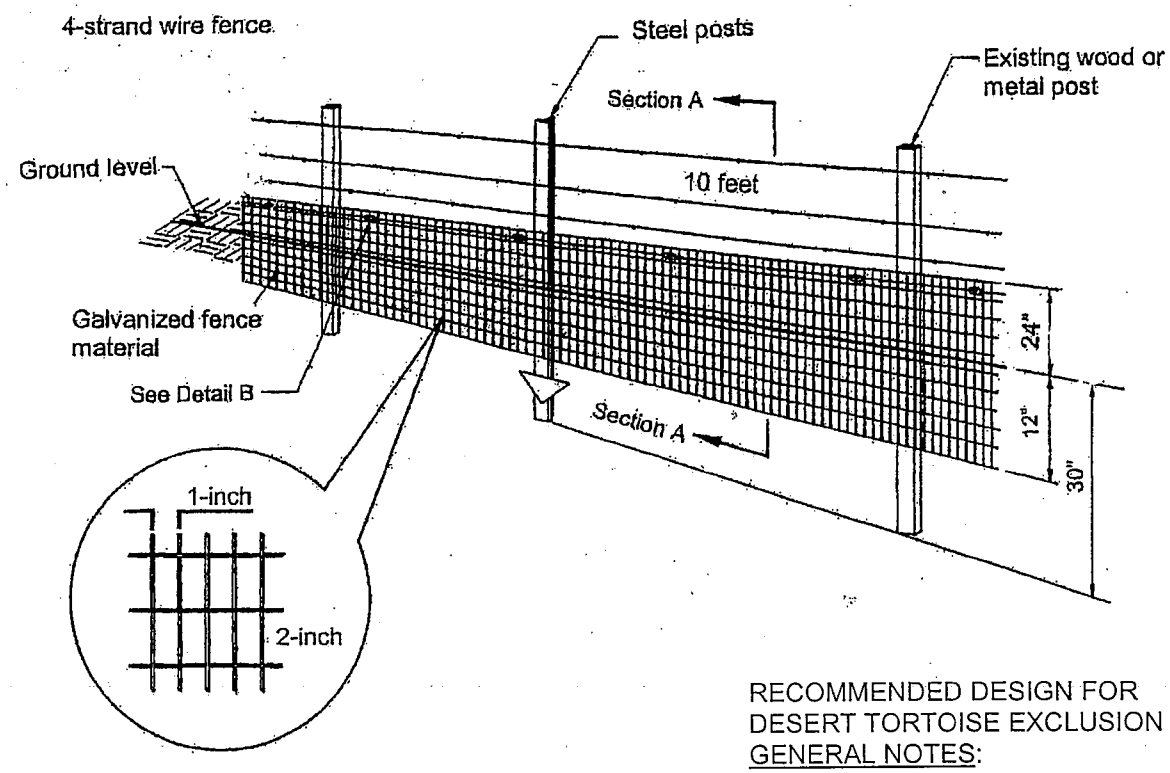
(7) If desert tortoises are to be moved into an area that already supports a population--even one that is well below carrying capacity--the recipient population should be monitored for at least 2 years prior to the introduction. Necessary data include the density and age structure of the recipient population, home ranges of resident desert tortoises, and general ecological conditions of the habitat.

Areas along paved highways can serve as good translocation sites, if properly fenced. Many such areas support good habitats, but vehicle-caused mortalities and/or collecting have substantially reduced or totally extirpated adjacent desert tortoise populations. Any translocation sites should be isolated by a desert tortoise barrier fence or similar barrier next to the highway or road. The purpose of fencing the highway is obvious--to keep translocated animals from being crushed by vehicles on the road. However, fencing the other sides of the translocation area is critical for establishment. If a fenced area or strip of habitat approximately 0.125 to 0.25 mile wide is established along highways, some translocatees should establish home ranges and a social structure within this strip. When the inside fence is removed, the translocated desert tortoises and those from the extant population farther away from the road will eventually expand their home ranges into the remaining low-density areas. A second reason for inside fencing is to prevent any diseased, but asymptomatic, desert tortoises from infecting nearby, healthy populations. In the event that disease is an issue and a resident population is present nearby, double inside fencing should be considered.

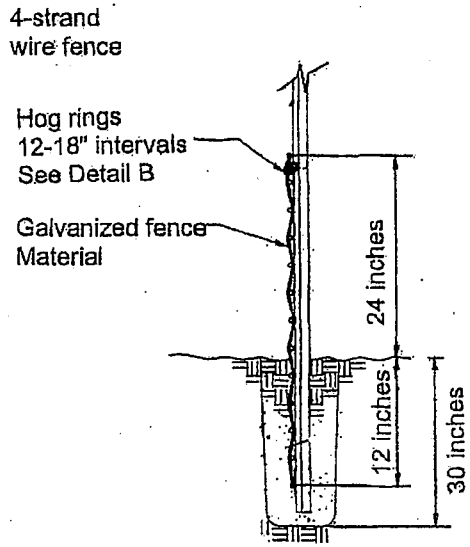
ATTACHMENT DR-BIO-54-B

RECOMMENDED SPECIFICATIONS FOR PERMANENT DESERT TORTOISE EXCLUSION FENCE

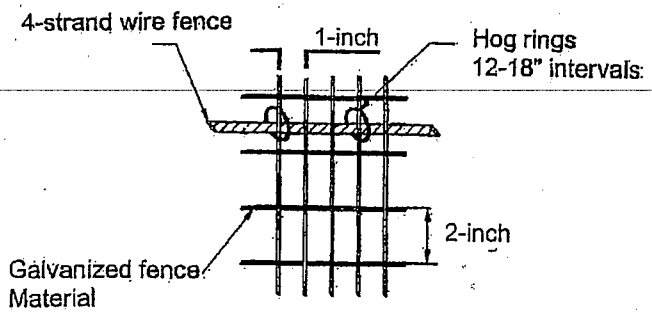
DESERT TORTOISE EXCLUSION FENCE (2005)



DETAIL A



SECTION A



DETAIL B

RECOMMENDED DESIGN FOR
DESERT TORTOISE EXCLUSION FENCE
GENERAL NOTES:

1. Ensure that fence posts and materials conform to the standards approved by the U.S. Fish and Wildlife Service.
2. Ensure that the height above ground level is no less than 18 inches and no higher than 24 inches.
3. Ensure that the depth of fence material below ground level is about 12 inches but no less than 6 inches. (See SECTION A above)
4. Install additional steel posts when span between existing fence posts exceed 10 feet.
5. Attach fence material to existing fence or wire using hog rings at 12-inch intervals.
6. Fasten fence material to posts with 3 tie wires with a wire near the top, bottom, and center of the fence material.
7. Backfill trenches with excavated material and compact the material.
8. Attach fence material to all gates. Ensure that clearance at base of gate achieves zero ground clearance.
9. Substitute smooth wire for barbed wire if additional support wires are necessary.
10. The number and placement of support wires may be modified to allow sheep and deer to pass safely.
11. Erosion at the edge of the fence material where the fence crosses washes may occur and requires appropriate and timely monitoring and repair.
12. Tie the fence into existing culverts and cattleguards when determined necessary to allow desert tortoise passage underneath roadways.

FOR BEDROCK OR CALICHE SUBSTRATE

1. Use this fence design (see below) only for that portion of the fence where fence material cannot be placed 6 inches below existing ground level due to presence of bedrock, large rocks or caliche substrate.

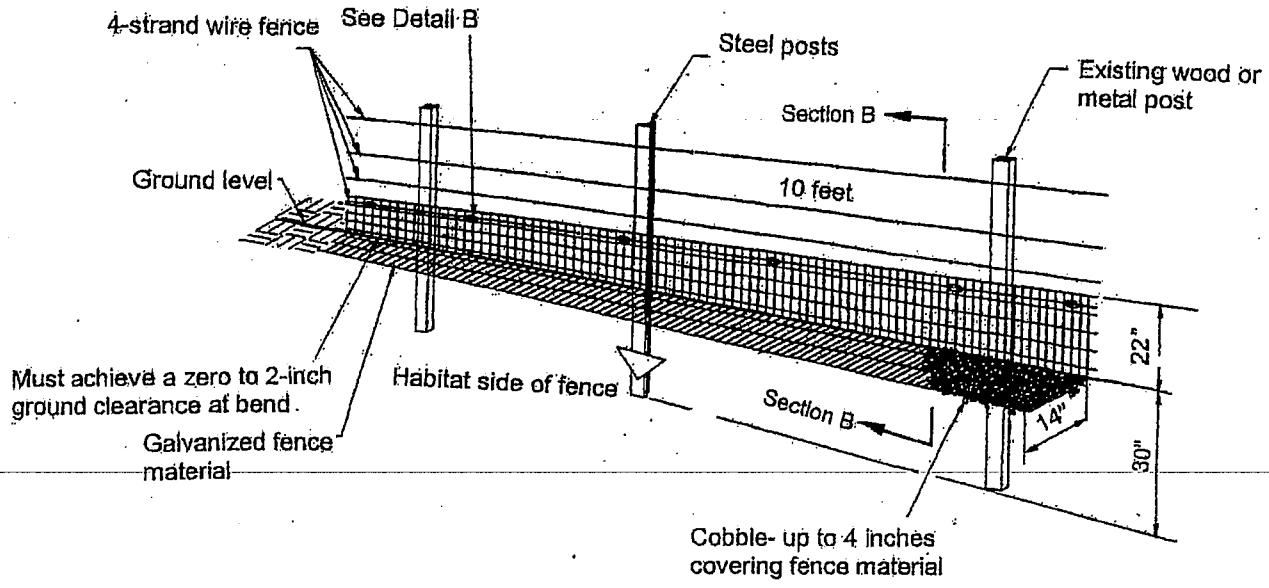
2. Ensure that the fence height above ground level is no less than 22 inches.

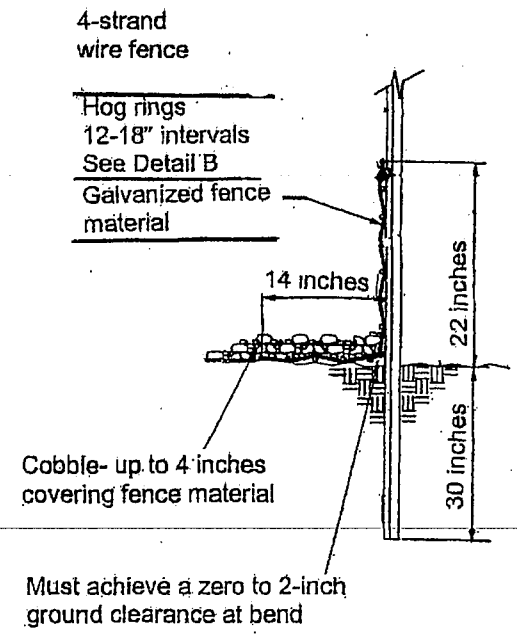
3. Ensure that there is a zero to 2-inch ground clearance at the bend.

4. Ensure that the bent portion of the fence is lying on the ground and pointed in the direction of desert tortoise habitat.

5. Cover the portion of the fence that is flush with the ground with cobble (rocks placed on top of the fence material to a vertical thickness up to 4 inches).

6. When substrate no longer is composed of bedrock or caliche, install fence using design shown above.





SECTION B

ATTACHMENT DR-BIO-54-C

CLEARANCE SURVEY PROTOCOL FOR THE DESERT TORTOISE – MOJAVE POPULATION

CHAPTER 6. CLEARANCE SURVEY PROTOCOL FOR THE DESERT TORTOISE - MOJAVE POPULATION

6.1. Objectives

- Locate as many desert tortoises as possible within the project site.
- Remove all desert tortoises encountered from the project site.
- Safely excavate, collect, and rebury desert tortoise eggs.

6.2. Applicability of Clearance Surveys

For projects located in occupied desert tortoise habitat, especially those projects with a permanent or linear disturbance (e.g., pipelines, roads, transmission lines), a clearance survey may be required as part of the Terms and Conditions of a biological opinion or incidental take permit. This survey is intended to reduce the likelihood that desert tortoises are killed or injured as a result of the proposed action. Clearance survey methods may include temporarily penning desert tortoises within the area surrounding its burrow, relocating desert tortoises from the impact area, or translocating desert tortoises to a designated area outside its home range in accordance with a USFWS-approved translocation plan (Section 7.10).

6.3. Methodology

- Clearance surveys require 100 percent coverage of the project area, with a focus on locating all desert tortoises above and below ground within the project area. This survey would be conducted immediately prior to surface disturbance at each site within the project area or following construction of a desert tortoise-proof fence or similar barrier encompassing the project area to ensure that tortoises cannot enter the project area.
- Clearance surveys at the project site must consist of at least 2 consecutive surveys of the site. Surveys shall involve walking transects less than or equal to 15-feet (5-meter) wide under typical conditions. In areas of dense vegetation or when conditions limit the ability of the surveyor's to locate desert tortoises, transects should be reduced in width accordingly. Clearance surveys should be conducted when desert tortoises are most active (April through May or September through October). If desert tortoises are found during the second pass, the USFWS and appropriate State wildlife agency may require a third survey. If any desert tortoises need to be translocated follow the USFWS-approved translocation plan for that project.
- After the desert tortoise exclusion fence has been installed, the fencing should be checked several times a day to ensure a tortoise has not been trapped within the fence and may be exposed to lethal temperatures. Desert tortoises often pace along new fences attempting to gain access to the other side or return to areas from which they were removed.
- All methods used for handling desert tortoises during the clearance surveys must be in accordance with this Manual. Anyone that handles desert tortoises during clearance activities must have the appropriate authorizations from USFWS and the State.
- During the clearance surveys, desert tortoises in burrows may be removed through tapping (Section 6.4) or careful excavation. Multiple visits may be necessary if desert tortoises are inaccessible in deep caves or burrows.

- During all handling procedures, desert tortoises shall be treated in a manner to ensure that they do not overheat or exhibit signs of overheating (e.g., gaping, foaming at the mouth, etc.), or are placed in a situation where they cannot maintain surface and core temperatures necessary to their well-being. Desert tortoises shall be kept shaded at all times until it is safe to release them. Ambient air temperature shall be measured in the shade, protected from wind, at a height of 2 inches (5 centimeters) above the ground surface. All clearance activities (capture, transport, release, etc.) shall occur when ambient temperatures are below 95 degrees F (35 degrees C) and not anticipated to rise above 95 degrees F (35 degrees C) before handling and processing desert tortoises are completed. Refer to section 7.4 for handling desert tortoises during hot temperatures.
- If a desert tortoise is encountered aboveground and outside the temperature limits refer to Section 7.4 or 7.5.
- The area cleared and number of desert tortoises found within that area must be reported to the local USFWS and the appropriate State wildlife agency. The report should be made in writing, either by mail or email. Notification should be received within one week.
- If a desert tortoise is encountered after clearance surveys have been completed, process the tortoise according to the methods described above.

6.4. Extracting Desert Tortoises from Burrows

Before touching a desert tortoise or using any instrument that comes into contact with a desert tortoise, implement procedures described in Section 7.6. Examine the burrow for other occupants (e.g., snakes, spiders, scorpions, wasps, Gila monsters, etc.). Firmly pound the soil at the side of the "apron" or soil mound at the entrance of the burrow 5 to 6 times with an open hand then listen for desert tortoise movement; wait 30 seconds and repeat several times if needed. Avoid disturbing or pounding the center of the apron or entrance of the burrow where desert tortoises typically dig nests and lay their eggs. If the desert tortoise is visible deep in its burrow, the observer can gently tap the carapace 3 to 4 times with a stick (Medica et al. 1986). The observer should then remove the stick and move away from the burrow entrance. If tapping is successful, the desert tortoise will emerge, usually to the burrow entrance. If desert tortoise movements are not heard within a few minutes, discontinue tapping.

If the desert tortoise is within arm's reach, firmly grasp the gular, plastron, or posterior edge of the carapace and gently pull the tortoise towards the burrow entrance. If the desert tortoise resists to the point where moderate pulling effort is unsuccessful, stop pulling while maintaining a grip on the tortoise; resume when the tortoise relaxes. **Never use a hook or other instrument to remove a desert tortoise from a burrow or otherwise compromise the integrity of a burrow if the desert tortoise will remain in the project area.**

If the area is to be cleared of all desert tortoises, excavate the burrow as described in Section 6.5. If the tortoise is in a deep caliche cave which cannot be excavated without potentially harming the desert tortoise, record the location and contact the USFWS for instruction.

6.5. Excavating Burrows

According to most agency documents, desert tortoise burrows are excavated only if they occur within a proposed disturbance area. If excavating a burrow to relocate a desert tortoise, and an artificial burrow is required, it should be constructed before beginning the excavation (Section 6.7.). Biological opinions and permits typically require that such areas be flagged and that project activities be confined to those areas. As an alternative to excavation in certain circumstances, the immediate area surrounding a burrow occupied by a desert tortoise may be temporarily penned, if authorized by the USFWS and the appropriate State wildlife agency (Section 6.9.).

When required, take measurements of the burrow before excavating it. Before excavation, feel for desert tortoise eggs by gently probing the soil in front of the burrow opening (i.e., the mound) with a blunt instrument (e.g., knitting needle) or similar instrument, and along the floor of the burrow as you excavate the burrow. The purpose of probing is to locate areas of excavated soil which are less compacted and may indicate a nest. Eggs have been found up to 6 feet (1.9 meters) in front of burrow openings and up to 6 feet (1.9 meters) within the entrance of a burrow; they may also occur in the mound at the burrow opening. To avoid crushing eggs, do not scrape the shovel across the bottom of the burrow, but continue to probe the area with your fingers as you proceed. Removal of the top 10 inches (25 centimeters) of soil (or until a hard layer of soil is encountered) will typically ensure that you find any desert tortoise eggs. Be particularly careful from late April to mid-October when eggs are most likely present. If found, follow the USFWS's egg handling protocol (Section 6.6.).

Excavators should wear leather or cloth gloves during burrow excavation to avoid being bitten or stung by venomous animals. Use blunt-nosed shovels or garden trowels. The preferred method involves two individuals, each with a shovel, to excavate a burrow. Place a shovel in the burrow entrance, or garden trowel for small burrows, and slice away the ceiling with the second shovel or trowel. Remove the soil with the first shovel or trowel as excavation proceeds and repeat. Excavate the burrow slowly and carefully and stop often to see if a desert tortoise is within reach. Do not collapse the burrow ahead of the shovel or trowel inside the burrow. You should feel the shovel contact the other shovel with each stroke to avoid striking a desert tortoise. It may take several minutes or several hours to excavate a desert tortoise burrow, depending on its length and other characteristics.

Always excavate the burrow to its absolute end(s), and then excavate an additional foot-or-so (0.3 meter) of harder soil beyond the suspected end to ensure that a desert tortoise is not behind a dirt plug or mound. Search all side tunnels within the burrow for desert tortoises, especially in kit fox dens. If a desert tortoise is found, do not assume that it is alone. After removing the first desert tortoise encountered, return to the burrow and continue to excavate it looking for additional desert tortoises. After excavating the burrow, leave it collapsed so that no desert tortoise may reuse it easily.

When excavating a burrow, stop digging when a desert tortoise is encountered. If during the desert tortoise less-active period (i.e., during July - August, and November - February; in Arizona the less-active period may begin in late May or June), relocate the desert tortoise to an artificial burrow. If it is during the most-active period (i.e., when desert tortoises are most likely

above ground; March - June, and September - October), place the desert tortoise in the shade of a shrub, or depending on conditions, in an artificial burrow (Section 6.7.).

6.6. Nest and Egg Handling Protocol

Desert tortoises may lay eggs during the months of May through July and usually hatch July through October. Some eggs may not hatch, or hatchlings may not emerge until the following spring. Because desert tortoise eggs are also protected by the ESA, the Authorized Biologist shall search for nests and encouraged to search prior to clearance surveys. Desert tortoise eggs shall be moved to artificial nests either in the wild or at a USFWS-approved facility. If you encounter unemerged hatchlings, contact the USFWS and appropriate State wildlife agency for instructions. Authorized Biologists must receive special training in the procedures outlined below. If you discover a nest and have not been trained, the nest shall be carefully covered with soil so as not to move the eggs then contact the USFWS and appropriate State wildlife agency for instructions.

Any nest that is found shall be carefully excavated by hand at a time of day when the air temperature 6 inches (15 centimeters) above the ground is approximately equal to the soil temperature at egg level. Immediately upon finding a nest, discontinue using large tools. The Authorized Biologist shall excavate the nest using his or her hands. Disposable rubber or latex gloves must be worn when marking and handling eggs. Before disturbance of nest contents, each egg shall be gently marked with a small dot on the top using a felt-tipped pen to establish the egg's orientation in the nest. In handling nest contents, eggs must be maintained in this orientation at all times. Because egg shells become extremely fragile in the last few weeks before hatching, special care shall be taken with eggs found from August to mid-October. Because the egg is very fragile, it may break during handling; this will be lethal to the developing tortoise inside. Broken eggs shall be buried nearby and left in the field, or the contents preserved and made available for research projects. Report broken eggs to the USFWS and appropriate State wildlife agency as required for tortoise mortalities.

The Authorized Biologist shall measure and record the depth of the nest below the soil surface, the cardinal location of the nest in relation to any adjacent shrub (i.e., north, south, east, or west side of the shrub), the species of shrub and its approximate foliage volume, and the soil type. Place approximately 1 inch (2.5 centimeters) of soil from the nest area in a bucket and carefully transfer the eggs to the bucket, maintaining egg orientation. Gently cover the eggs with soil that is free of cobbles and pebbles, to a depth equivalent to that of the original nest.

If good desert tortoise habitat is available in the general area, the eggs shall be relocated between 150 to 1,000 feet (45.7 to 305 meters) from outer boundary of the project site, unless directed differently by USFWS. Eggs and tortoises shall only be placed on lands administered by a Federal agency or on lands when a written authorization to bury the eggs or relocate the tortoises has been obtained. A nest shall be prepared with the same depth, orientation, location in relation to a specific shrub species, and in the same soil type as the original nest. The eggs shall be transferred to the new nest, maintaining their original orientation. The eggs shall be replaced so that they touch one another. Gently cover with soil from which cobbles and pebbles have been removed so that all the air spaces around the eggs are filled. Relocated nests in the wild shall be monitored by an Authorized Biologist. The monitoring program shall be developed in

consultation with the USFWS and appropriate State wildlife agency. Care must be taken to remove any scent of tortoise eggs or human activity at the nest site to minimize nest predation.

If a suitable site for a nest is not available in the wild, the eggs shall be prepared for incubation in a suitable holding facility. A small amount of soil shall be placed in a bucket and the eggs transferred to the bucket using the technique specified above, making sure that the eggs are touching one another. The bucket shall be carefully filled to the depth of the original nest, but leave the top of the soil layer 3 inches (7.6 centimeters) below the rim of the bucket so that future hatchlings cannot escape. The bucket shall be buried in soil in a safe location at a holding facility approved by the USFWS and appropriate State wildlife agency.

The Authorized Biologist shall record in detail all the procedures used in moving eggs. Personnel caring for incubating eggs at a facility shall maintain a record of where the eggs were found, method of incubation, length of time and conditions under which the eggs were incubated, observations of eggs during the incubation period, information about hatchling health and behavior, and disposition of the hatchlings.

6.7. Constructing Artificial Burrows

Constructing an artificial burrow will take from 30 minutes to several hours, depending on the substrate. An artificial burrow is intended to provide replacement shelter and protection to a desert tortoise when removed from its natural burrow. The USFWS requires experience and training in burrow construction prior to being authorized to construct an artificial burrow. The information provided below including Figures 6.1 and 6.2 is a general description of the methods for constructing artificial burrows taken from Tortoise Group's adoption and care pamphlet (www.tortoisegroup.org).

Create an artificial burrow that is the same orientation and size as the burrow from which the desert tortoise was taken. The burrow for a juvenile desert tortoise should be 3 to 4 feet (0.9 to 1.2 meters) long and an adult tortoise burrow should be 5 to 6 feet (1.5 to 1.8 meters) long. Burrow construction involves digging a three-sided shelf upon which plywood will be placed to serve as the roof of the burrow. A channel is dug below the level of the shelf which approximates the width of the tortoise and functions as the actual burrow (Figure 6.1).

Determine the width and length to dig the shelf, place the plywood on the ground. Use corner stakes and twine to delineate the perimeter. Dig the burrow in a downward slant of 15 to 20 degrees below the horizontal line of the ground (Figure 6.2). Place the plywood onto the shelf. Fit the plywood snugly and then remove it. Next, dig the channel and loosen the soil along the floor of the channel to a depth of 6 inches (15.2 centimeters) to allow a tortoise to dig its way out should the plywood sag and possibly trap or pin it in the burrow. Replace the plywood and shovel dirt on top. Place rocks along the eave of the burrow roof, above the opening (Figure 6.2). Mound the dirt so that rain water will not puddle on top of the finished burrow.

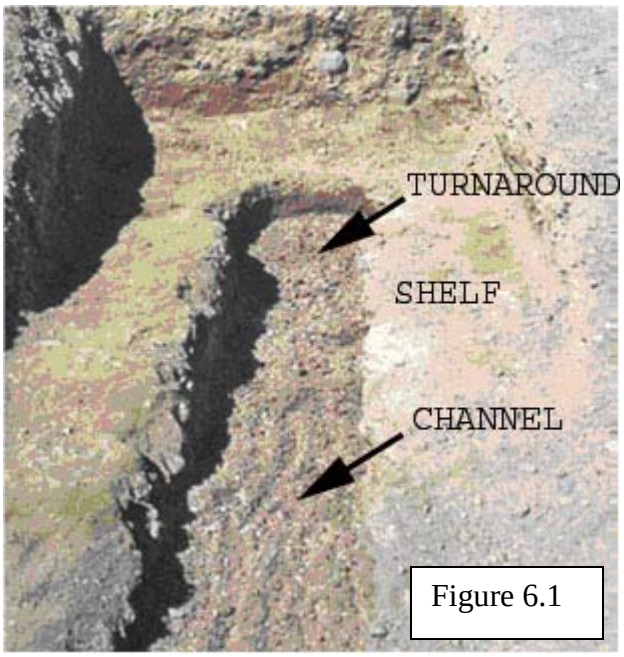


Figure 6.1

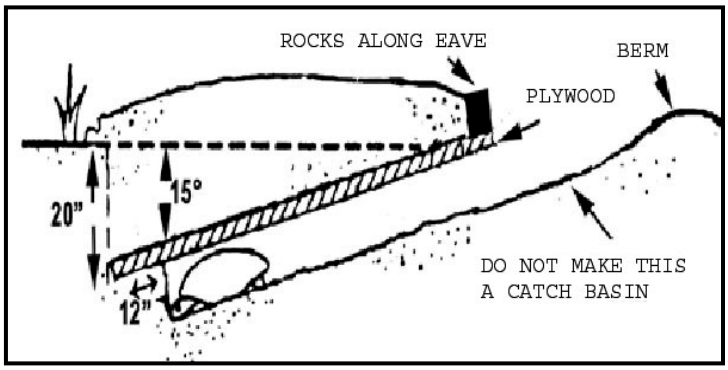


Figure 6.2

We recommend that you cover the opening of the artificial burrow with rocks or wood for 2 or 3 days to ensure that the tortoise remains within the burrow and out of harm's way, or that it resumes hibernation or aestivation. Alternatively, the tortoise and its burrow may be temporarily penned (Section 6.9). Providing an artificial burrow is particularly important if most of the burrows have been lost to disturbance and a desert tortoise would be unable to find an existing burrow in a reasonable amount of time. After several days, when project activities have ceased in the area (i.e., as on a pipeline or transmission line), or when you are reasonably sure that the tortoise is safely hibernating or aestivating, **it is absolutely essential that you remove the rocks from the opening of the blocked burrow or remove the pens around the tortoise and its burrow.**

6.8. Mapping and Finding Blocked Burrows

If you block a desert tortoise inside a burrow or temporarily pen the tortoise and its burrow according to instructions from the USFWS, you must return to that burrow and unblock it or remove the enclosure as soon as possible. Tortoises shall not be blocked in burrows during extreme high temperatures and construction activity shall be carefully monitored in the area around the blocked or penned tortoise. Accurately map the burrow with GPS so that you can find it again. Additionally, we recommend that you mark the area as a backup in case of GPS failure. For example, mark burrows with lath or ribbon placed a minimum of 100 feet (30.5 meters) from burrow. The marker should provide a cryptic message sufficient to locate the burrow (e.g., B23-2100FTS, to indicate that Burrow #23 on Reach 2 is 100 feet (30.5 meters) south of the lath (LaRue 1993)). The area must be discretely marked to avoid attracting people or ravens to the burrow.

6.9. Temporarily Confining Desert Tortoises

Desert tortoises found in the project area sheltering in a burrow during a period of reduced activity (e.g., winter), may be temporarily penned according to instructions from the USFWS. Tortoises shall not be penned in burrows during extreme high temperatures and construction activity shall be carefully monitored in the area around the penned tortoise. The methodology for penning desert tortoises (U.S. Department of Defense 2005) is adapted from a methodology developed by Gilbert Goodlett (EnviroPlus Consulting, Ridgecrest, California). Generally,

desert tortoises should not be penned in areas of moderate or heavy public use. Penning shall be accomplished by installing a circular fence, approximately 20 feet (6 meters) in diameter to enclose the tortoise/burrow. The pen should be constructed with durable materials (i.e., 16 gauge or heavier) suitable to resist desert environments. Fence material should consist of ½-inch hardware cloth or 1-inch horizontal by 2-inch (2.5 by 5.0 centimeters) vertical, galvanized welded wire. Pen material should be 24 inches (50 centimeters) in width. Steel T-posts or rebar (2 to 3 feet or 0.6 to 0.9 meter) should be placed every 5 to 6 feet (1.5 to 1.8 meters) to support the pen material. The pen material should extend 18 inches (45.7 centimeters) aboveground. The bottom of the enclosure shall be buried 6 to 12 inches (15 to 30 centimeters) or bent inward (towards the burrow), soil mounded along the base, and implement other measures to ensure zero ground clearance. Care shall be taken to minimize visibility of the pen by the public. An Authorized Biologist or Desert Tortoise Monitor shall check the pen at least daily and ensure that the desert tortoise is in the burrow or pen, the desert tortoise is okay, and the pen is intact. All instances of penning or issues associated with penning shall be reported to the USFWS within 3 days.

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ATTACHMENT DR-BIO-54-D

GUIDELINES FOR HANDLING DESERT TORTOISE DURING CONSTRUCTION PROJECTS

GUIDELINES FOR HANDLING DESERT TORTOISES

DURING CONSTRUCTION PROJECTS

July 1994
(Revised July 1999)

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California Department of Fish and Game
Nevada Department of Wildlife
Arizona Game and Fish Department
Utah Division of Wildlife Resources

Warning: These Guidelines do not authorize individuals to handle tortoises. Such authorization should come from Federal and State wildlife resource agencies, including, at least, those listed above.

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GUIDELINES FOR HANDLING DESERT TORTOISES DURING CONSTRUCTION PROJECTS

Developed by the Desert Tortoise Council

Handling of desert tortoises and other forms of "take" (includes to harass, harm, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct) are prohibited by section 9 of the Endangered Species Act of 1973, as amended. Desert tortoise handling can only be authorized through an incidental take statement in a biological opinion, an incidental take permit (section 10(a)(1)(B) permit), or a scientific collecting permit (section 10(a)(1)(A) permit). The regulatory document(s) or permit(s) authorizing handling are the ultimate guides to how desert tortoises should be handled. We expect that these documents will often authorize handling in accordance with the following handling guidelines.

The following Guidelines have been reviewed and are based on information provided to the Desert Tortoise Council (DTC) by the U.S. Fish and Wildlife Service (Reno and Las Vegas, NV; Ventura and Carlsbad, CA; Phoenix, AZ; Salt Lake City, UT), California Department of Fish and Game (Chino and Long Beach, CA), Utah Division of Wildlife Resources (Cedar City, UT), Nevada Department of Wildlife (Las Vegas, NV), Arizona Game and Fish Department (Phoenix, AZ), U.S. Bureau of Land Management (Saint George, UT; Riverside, CA; Phoenix, AZ), several private consultants, and other individuals. Individuals contacted to develop and/or review these Guidelines are listed in Attachment 1.

The Guidelines are intended for use during construction projects monitored by authorized biologists (tortoise monitors) who are working on behalf of a project proponent in the absence of special regulatory requirements, such as a 10(a)(1)(A) scientific collecting permit. The Guidelines will be helpful to tortoise monitors performing clearance surveys and construction monitoring where tortoises need to be moved out of harm's way. They are intended to be used in coordination with U.S. Fish and Wildlife Service (USFWS) Biological Opinions issued to federal action agencies (e.g., U.S. Bureau of Land Management (BLM), U.S. Army Corps of Engineers, etc.), and state agency documents for state-authorized actions. Although useful information is provided, the Guidelines are **not** intended to replace scientific research project methodologies for handling and processing tortoises.

These Guidelines do not authorize tortoise handling. Depending on the project, responsible federal and state agencies review a person's résumé and authorize him/her to handle tortoises. These Guidelines are provided for tortoise monitors already authorized, or who hope to be authorized, by federal and state agencies. The DTC assumes that such monitors are qualified to handle and process tortoises. These Guidelines include methods and alternatives that are effectively used by professional tortoise researchers to safely handle tortoises in the field. The DTC believes that tortoise handling should be an evolving process, continually updated to include the latest, most effective and efficient methods for safe handling. A wealth of information is already available, and these Guidelines provide that information to construction monitors.

A sequential checklist for use in the field is included (section **F.**). When necessary, the checklist should be cross-referenced with the Guidelines for more detailed information. The inexperienced monitor should use the checklist as a reminder of steps to be taken when handling and processing tortoises, and should be completely familiar with the Guidelines **before** handling tortoises. The experienced monitor may also gain useful information from these Guidelines.

You are encouraged to submit comments on these Guidelines to the USFWS and the DTC. In subsequent years, the DTC will work with the USFWS, using your input, to ensure that the Guidelines are revised to incorporate new information and techniques.

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GUIDELINES FOR HANDLING DESERT TORTOISES

A. PRELIMINARY STEPS

A.1. Federal and state authorizations

Once you are selected by a project proponent to monitor construction, your résumé is typically submitted to the nearest field office of the USFWS at least 15 days prior to construction. You may also need to submit your résumé to the federal action agency (i.e., the federal agency with whom the USFWS has consulted under Section 7 of the Act) and state wildlife agencies. Within the State of Utah, any individual (including any qualified biologist) must obtain a section 10(a)(1)(A) permit from the USFWS to be authorized to handle desert tortoises. Within the States of Arizona, California, Nevada, and Utah, individuals must obtain the appropriate permits from the respective State wildlife agency to be authorized to handle tortoises. If your résumé has not been previously accepted by the responsible agency(s), you should not assume that you are approved until you have written or verbal confirmation from them. After you are authorized, you must read and comply with any federal and state regulatory documents for the project.

A.2. Specific requirements for monitors

The USFWS requires that you observe field demonstrations for egg handling or artificial burrow construction before performing either of these activities. Since 1993, the DTC has arranged for USFWS-authorized biologists to demonstrate these procedures at its annual workshop. Those observing the demonstrations were given certificates. Such demonstrations may be available at future DTC workshops, depending on demand.

The USFWS distinguishes between desert tortoise biologists and environmental monitors as follows: Biologists should (a) possess a bachelor's or graduate degree in biology, ecology, wildlife biology, herpetology, or related fields; (b) demonstrate a minimum of 60 days prior field experience using accepted resource agency techniques to survey for desert tortoises; and (c) have the ability to recognize and to accurately identify and record all types of desert tortoise sign. Generally, only qualified biologists, and not environmental monitors, may handle tortoises. Environmental monitors may handle tortoises in emergency situations, but only if they have explicit authorization to do so by the appropriate office of the USFWS.

A.3. Sequential numbering scheme

Prior to beginning the project, you should contact the USFWS and/or other regulatory agency to determine if tortoises are to be marked for your project. In California, the BLM and United States Geological Survey - Biological Resources Division (USGS - BRD) assign tortoise numbers that are used by scientists to mark tortoises on study plots located throughout the Mojave and Colorado Deserts. If your project is near one of these plots, it is important that you contact the appropriate offices of the BLM and USGS - BRD before marking tortoises to ensure that your numbers will not be confused with those used by the federal agencies.

A.4. Examples of numbering schemes

If tortoises are to be marked, they should be identified by project initials and numbers. Examples include: (a) initials of the project followed by a sequential number; (e.g., "MB1" for the first tortoise marked on the Morongo Basin Pipeline project, "MB2" for the second, etc.); (b) initials of the monitoring organization followed by a sequential number; (e.g., "DTC1" for the first tortoise marked by the Desert Tortoise Council on a project, "DTC2" for the second, etc.).

A.5. Getting organized

The materials that you are likely to need for handling tortoises are listed in Attachment 2. Many researchers organize their materials so that they have a "tortoise handling kit for the field," "tortoise handling kit for the truck," "burrow excavation kit," "tortoise marking kit," etc. In any case, it is important that you have all the materials that you need to safely and quickly handle tortoises. It is equally important that you be organized and ready to handle tortoises expeditiously when they are found.

B. IN THE FIELD

While monitoring construction, you will observe tortoises either aboveground or in burrows. When aboveground, tortoises should only be moved if in harm's way. If not, do not handle them, but monitor them to ensure that they are not adversely affected by construction. Depending on the circumstances, tortoises that are beneath machinery, in trenches or pipes, under pallets, or anywhere within the right-of-way may be in danger and need to be moved. If they must be moved, use the appropriate recommendations in these Guidelines to ensure safe handling.

You will also find tortoises in burrows in areas where they will be harmed if not moved. The following sections advise you on how to handle such tortoises.

B.1. Prior to excavating burrows

B.1.a. Determining if burrows should be excavated - According to most agency documents, tortoise burrows are excavated only if they occur within a construction right-of-way, in an area to be cleared of vegetation, or in areas that will not be cleared, but will be negatively impacted by heavy equipment, such as staging areas and turnarounds. The agency document typically requires that such areas be flagged and that construction activities be confined to those areas.

If a tortoise burrow is inside the designated construction area and will be damaged or destroyed, excavate it. Spider webs, litter, and other debris may accumulate in burrow openings overnight, and openings may collapse during winter rains. Do not assume that a burrow is inactive if it looks unused or collapsed. Tortoises may use canid or mustelid digs, and may be found in burrows of other animals, particularly kit foxes. Burrowing owls may use tortoise burrows, but do not assume that burrows occupied by owls are not also occupied by tortoises. Juvenile tortoise burrows may resemble rodent burrows, or juveniles may be inside such burrows. Therefore, excavate **all** burrows that will be lost to construction. If a burrow opening is outside the construction area, but a tortoise at the end of the burrow may be within the area, excavate it. Remember that a burrow may extend 30 feet beyond the opening.

B.1.b. Describing burrows - When possible, we recommend that you take measurements of the burrow before excavating it. The information should be recorded in your field notebook, and, if a tortoise is present, would be transferred to the data sheet (section **E.**). Measure the width and height just inside the opening of the burrow, the length (in many cases you cannot measure the length until you are finished excavating the burrow), determine burrow orientation using a compass, and record its condition using the categories given below. We recommend that you use permanent black ink and high rag content, acid-free paper for recording data. The following categories may be used to describe the conditions of burrows (U.S. Fish and Wildlife Service 1992):

Class:
1. currently active, with tortoise or recent tortoise sign
2. good condition, definitely tortoise; no evidence of recent use
3. deteriorated condition; definitely tortoise (please describe)
4. good condition; possibly tortoise (please describe)
5. deteriorated condition; possibly tortoise (please describe)

B.1.c. Other considerations - Depending on the time of year and other conditions (*B.5.c.ii.*) you may need to construct a burrow **before** you remove a tortoise from its natural burrow. Recommended techniques for burrow construction are discussed in section *B.5.f.*

B.2. Mapping burrows

If a burrow is to be excavated, there are several important reasons for mapping it: (a) resource agencies can determine how many tortoises were encountered on the project compared with the number of burrows excavated; (b) the information will be available for future projects in the same area; (c) burrow locations may be important for organizing monitors and determining tortoise "hot spots" versus areas where few, if any, tortoises are found; and (d) the number and location of burrows found during initial tortoise surveys can be compared with the number and location of burrows found during monitoring; (i.e., the data may provide information to determine appropriate take limits based on the findings of initial surveys). Typically, the USFWS requires that the number of tortoises observed during construction be reported. Mapping the information will show the location of the tortoises. Some monitoring supervisors require that all tortoise sign be mapped. If an artificial burrow is used, we recommend that it be accurately mapped. If the burrow is blocked (section *B.5.f.i.*), it is essential that you map it and mark it in the field so you can find and unblock it later.

B.3. Map types

When you map burrows, we recommend that they be numbered and shown on maps of appropriate scale. If monitoring a linear right-of-way, it often helps to number burrows sequentially within a given section of the alignment (e.g., "B-23-2," for burrow #23 on reach 2). Mapping is important if many monitors are locating, numbering, and mapping burrows simultaneously. United States Geological Survey (USGS) 7.5' topographical maps (scale 1" = 2,000'), or enlargements of them, are useful. Project maps at a scale of 1" = 100' or 1" = 200' are particularly useful when burrows are common and better resolution is necessary. The assigned numbers may be cross-referenced with data sheets, field notes, and photographs.

B.4. Excavating burrows

B.4.a. Looking for eggs - Feel for tortoise eggs by gently probing the soil in front of the burrow opening (i.e., the mound) and along the floor as you excavate the burrow. Eggs have been found up to six feet in front of burrow openings and up to six feet within the entrance of a burrow; they may occur in the mound at the burrow opening. To avoid crushing eggs, do not scrape the shovel across the bottom of the burrow, but continue to probe the area with your fingers as you proceed. Removal of the top ten inches of soil (or until a hard layer of soil is encountered) will typically ensure that you find any tortoise eggs. Be particularly careful between late April and mid-October when eggs are most likely present. If found, follow the USFWS's egg handling protocol (Attachment 3). Although not included in the protocol, we strongly recommend that you wear disposable latex gloves when handling eggs.

B.4.b. Excavating burrows - We recommend that monitors wear leather or cloth gloves during burrow excavation to avoid being bitten or stung by venomous animals. Blunt-nosed shovels or garden trowels are useful. If available, two monitors, each with a shovel, may excavate a burrow. One person may place his/her shovel in the burrow entrance and the other person, using a similar shovel or spade, would slice away the ceiling. Excavate the burrow slowly and carefully and stop often to see if a tortoise is within reach. It may take several minutes or several hours to excavate a tortoise burrow, depending on its length and other characteristics.

If you are the only monitor present, we recommend the following. Depending on the size and depth of the burrow, carefully slide an appropriate-sized plank six inches to two feet into the opening. You could use a 1" x 2" plank for smaller burrows and a 2" x 4" plank for larger burrows. Gradually collapse the burrow onto the plank, and remove the soil from the burrow tunnel as you go. Do not collapse the burrow ahead of the plank. You should feel the shovel contact the plank with each stroke. In this way, you will avoid striking a tortoise with the shovel. Alternatively, you may use a second shovel instead of the plank, which will facilitate removing soil from the burrow as you collapse it.

B.4.c. Finding and removing all tortoises - Regardless of the excavation method, you should always excavate the burrow to its absolute end(s), then excavate an additional foot-or-so of harder soil beyond the suspected end to ensure that a tortoise is not behind a dirt "plug" or mound. Search all side tunnels within the burrow for tortoises, especially in kit fox dens. If a tortoise is found, do not assume that it is alone. After removing the first tortoise encountered, you should return to the burrow and continue to excavate it looking for additional tortoises. After excavating the burrow, leave it collapsed so that no tortoise may reuse it easily.

B.5. Finding tortoises in burrows

B.5.a. Taking temperature readings - When a tortoise is encountered during burrow excavation, we recommend that you stop digging and check and record the air temperature [thermometer shaded at 1.5 m (4.9 ft) above the ground] and ground temperature [thermometer shaded at 1.0 cm (0.4 in) above the ground].

B.5.b. Deciding if tortoises should be processed - Data collected in a consistent manner during construction projects will be useful to resource agencies developing mitigation measures for future projects. However, the health of a tortoise is your number one priority. Only process a tortoise (i.e., weigh, measure, sex, and photograph it; section **B.7.**) if the situation allows you to do so without harming it or neglecting additional tortoises that may enter the construction site. If you are unable to do more than move a tortoise out of harm's way and monitor it to ensure its safety, you have done your job. Skip section **B.7.** if the situation is not right for processing a tortoise. The following sections discuss situations where you should or should not process tortoises.

B.5.c. Specific considerations before processing tortoises

B.5.c.i. Tortoise temperature preferences - The preferred daytime body temperature of desert tortoises is 69 °F to 101 °F (McGinnis and Voigt 1971). The critical maximum body temperature is between 103 °F and 112 °F (Brattstrom 1965, Naegle 1976). Berry and Turner (1984) found that juvenile tortoises preferred air temperatures of 63 °F to 66 °F during March, and 77 °F to 83 °F during June. Consequently, more juvenile tortoises were located in the morning (76.1%) than in the afternoon (23.9%). USFWS (1991) requires that measures be taken to ensure a tortoise does not overheat if it is processed when air temperature exceeds 90 °F at 1.5 m above the ground or if ground temperature exceeds 95 °F. Unless detailed processing (i.e., weighing, measuring, and photographing tortoises) is specifically required by federal or state agencies, we recommend that tortoises **not** be completely processed when air temperature exceeds 90 °F or ground temperature exceeds 95 °F. Under such conditions, the tortoise should be only inspected (section *B.7.d., B.7.e.,B.7.f.*), marked (section *B.7.g.*), and released (section *B.8.*).

B.5.c.ii. Other considerations - Based on the time of year and other conditions, we make the following recommendations to help you decide if tortoises should be processed. In this section, we assume that (1) you are authorized to handle tortoises during the authorized construction project, and (2) the tortoise must be moved out of harm's way regardless of extreme weather conditions or other potentially threatening situations.

B.5.c.ii.(a). During hot temperatures - When air temperature is greater than 90 °F or if the ground temperature is greater than 95 °F at the time you find a tortoise in a burrow that must be excavated, we recommend that you only inspect, mark, and release the tortoise (section *B.5.c.i*); construction of an artificial burrow may be necessary (*B.5.f.*). If possible, only excavate burrows and remove tortoises when temperatures do not exceed these limits. If a tortoise is found aboveground when these upper temperatures are exceeded, and the tortoise must be moved from harm's way, place it in the shade of a shrub, ideally in the vicinity of a nearby burrow of similar size (*B.8.a.*).

B.5.c.ii.(b). During cold temperatures - When tortoises are likely inactive (section *B.5.e.*), prior to removing them from their burrows, construct an artificial burrow and place the tortoise inside after it has been processed. The USFWS requires that you receive written permission from the private land owner if a tortoise is to be placed on private property.

B.5.c.ii.(c). At or near sunset - If a tortoise with a midline carapace length (MCL) (section *B.7.h.*) less than or equal to 180 mm is rescued from the construction site at or near sunset, we recommend that it be held overnight in a clean, unused cardboard box and released the next morning near the capture site. A larger tortoise (i.e., MCL greater than 180 mm), which may be less prone to predation than a juvenile tortoise, does not need to be held overnight, but should be released under a shrub (section **B.8.** for more information on releasing tortoises). We recommend that the tortoise be monitored until it resumes normal behavior, "settles in" for the night, or until you are no longer able to watch it due to darkness. In such a situation, we recommend that you be at the release site at or before sunrise the next morning to look for and continue to monitor the tortoise.

B.5.c.ii.(d). If tortoises are seriously ill - If a tortoise has prevalent signs of Upper Respiratory Tract Disease (section *B.7.d.iv.*) or hyperthermia (section *B.6.a.i.*), or otherwise appears to be seriously ill, we recommend that you construct a burrow, place the tortoise inside, block its entrance (section *B.5.f.i.*), and call the USFWS or the action agency to inform them of the situation. If you are unable to reach the appropriate agency for further instruction, check the tortoise on the next day(s), continue to record observations on its health, and contact the agency as soon as possible.

B.5.c.ii.(e). Other situations - There will be times when you will be required to exercise judgment on the appropriate disposition of a tortoise. For example, if you are the only monitor on a pipeline project in an area of high tortoise density, you would not likely process tortoises because other tortoises may wander, unseen, into harm's way while you were doing so. You may put an "excavated" tortoise in an artificial, plugged burrow until pipe installation has moved out of the area. Use your common sense, and always keep the welfare of the tortoise in mind.

B.5.d. Transporting tortoises

B.5.d.i. Use a box - There are a few situations where a tortoise may be taken from the field, held overnight, and then released the next morning. We recommend that during transport each tortoise remain in a clean, unused cardboard box that is covered or closed. Newspaper placed in the bottom will absorb any urine that is voided. The box should be ventilated in such a way that a tortoise's leg or head will not get stuck. Never put more than one tortoise in a box. Do not allow tortoises to roam freely in the vehicle, nor should they be transported in shopping bags or other containers less sturdy than a new cardboard box. Mark the box or discard it immediately after use to be sure that it is not used for another tortoise.

B.5.d.ii. Precautions - Never place tortoises over the catalytic converter or other area that becomes hot with vehicle operation. Truck beds or floorboards should be padded and travel should be at speeds that minimize vibrations or shifting of the box. A tortoise should never be left unattended in a vehicle. During summer months, desert tortoises may be transported in an air conditioned vehicle as long as they are in a covered cardboard box and the vehicle interior temperature is maintained between approximately 75 °F and 80 °F. If a tortoise is taken during the winter inactivity period, it should be maintained at approximately 55 °F, which will be less stressful to it than much warmer temperatures, and may allow it to remain in a physiological state of hibernation.

B.5.e. Preliminary steps to handling tortoises - When a tortoise is encountered, stop digging. If it is during the tortoise inactivity period (i.e., typically during July and August, and between November and February, when tortoises are less likely found aboveground; in Arizona the inactivity period may begin in late May or June), we recommend that you or another monitor construct an artificial burrow into which the tortoise will be placed after processing. If it is during the activity period (i.e., when tortoises are typically found aboveground between March and June and again between September and October), we recommend that you place the tortoise in the shade of a shrub, or depending on conditions (section *B.5.c.ii*), in an artificial burrow.

In previous federal Biological Opinions, the USFWS has recommended that a tortoise removed from its burrow be placed in a similar-sized burrow found in the area. We do not recommend this for the following two reasons: (a) there is the possibility of exposing a clinically healthy tortoise to URTD or another pathogen in the similar-sized burrow; and, (b) burrows are often too deep to tell if a resident tortoise is already in the burrow, and placing the "excavated" tortoise into an occupied burrow would result in stressing both tortoises. Therefore, if conditions are appropriate (section *5.c.ii.*), we recommend that the tortoise be placed *beside* a burrow of similar size or be placed in an artificial burrow as described below.

B.5.f. Constructing burrows - A reasonable amount of time to create an artificial burrow is from 30 minutes to several hours depending on the substrate. A suitable burrow may be created in several minutes using a gas-powered auger.

B.5.f.i. The "traditional method" - An artificial burrow is intended to provide immediate shelter and protection to a tortoise that was hibernating or aestivating when you removed it from its natural burrow. The following are guidelines to assist artificial burrow construction (after Tortoise Group 1994). The USFWS requires that you observe a field demonstration before constructing a burrow.

Dig a burrow that is (a) roughly the same orientation and size as the burrow from which the tortoise was taken, (b) six feet long, and (c) slanted downward about 15 to 20° below the horizontal line of the ground. Next, slide the plywood top onto the shelf. Avoid knocking dirt into the tortoise crawl space by inserting the plywood onto the three-sided shelf from the front end of the burrow. Do not drop the plywood onto the burrow from above. Once you are sure the plywood fits snugly, remove the plywood, smooth out the bottom of the burrow, and be sure that it will accommodate the tortoise. Loosen the soil along the floor of the crawl space to a depth of six inches to allow a tortoise to dig its way out should the plywood sag and possibly trap or pin it in the burrow. Replace the plywood and shovel dirt on top. Mound the dirt so that rain water will not puddle on top of the finished burrow.

We recommend that you cover the opening of the artificial burrow with rocks or wood for two or three days to ensure that the tortoise remains within the burrow and out of harm's way, or that it resumes hibernation or aestivation. This is particularly important if most of a tortoise's burrows have been lost to construction and it would be unable to find an existing burrow in a reasonable amount of time. After several days, when construction activities have left the area (i.e., as on a pipeline or transmission line), or when you are reasonably sure that the tortoise is safely hibernating or aestivating, **it is absolutely essential that you remove the rocks from the opening of the blocked burrow.**

B.5.f.ii. Another method - EnviroPlus (Goodlett 1992) has found that a safe burrow can be created quickly using a gas-powered auger. They have observed wild tortoises voluntarily enter these burrows shortly after they are made. Different-sized augers are available to create burrows for juvenile or large adult tortoises. With an extension, the burrow can be dug to a depth of about five feet. Using an auger, you can make a burrow that meets the criteria suggested above for a traditional burrow.

B.5.f.iii. Mapping and finding blocked burrows - If you block a tortoise inside a burrow, you must find that burrow in a few days to unblock it. Accurately map the burrow so that you can find it again. Additionally, we recommend that you mark the area. For example, Tierra Madre Consultants (LaRue 1993) marks burrows with lath or ribbon placed a standard distance and direction from each burrow. A cryptic message is written on the lath to show burrow location: "B23-2100FTS," to indicate that "Burrow #23 on Reach 2 is 100 feet south of the lath." The area must be discreetly marked to avoid attracting people or ravens to the burrow.

B.6. Handling tortoises

B.6.a. Precautions while handling tortoises

B.6.a.i. Avoiding hyperthermia - Do not expose a tortoise to direct sunlight. Keep it in the shade of your body, a shrub, a truck, etc. Remember that ground temperatures are much hotter than air temperatures. You should not place a tortoise on the hot ground, but may remove the top several inches of hot sand to expose a cooler layer below. Indications of hyperthermia may include aggressive struggling by the tortoise, a tortoise hot to the touch, frothing at the mouth (i.e., excessive salivation), or voiding of the bladder. The critical maximum body temperature for desert tortoises is between 103 °F and 112 °F (Brattstrom 1965, Naegle 1976).

If an animal begins frothing at the mouth (i.e., salivating excessively) it is probably nearing a lethal body temperature and immediate action is required: (a) if already constructed, place the tortoise in the artificial burrow, or create a pallet burrow in the shade of a bush and place the tortoise inside; (b) pour water on the ground beneath a shrub and place the tortoise in the shade on the water; (c) pour tepid (approximately 68-95 °F) water over the shell and/or wipe the skin and shell with a wet cloth; and, (d) if an air conditioned vehicle is available, place the tortoise into a box and take it into the cool vehicle (section *B.5.d.ii.*). Heat-stressed tortoises should not be released until they resume normal behavior. They should be monitored after release.

B.6.a.ii. Avoiding transmission of Upper Respiratory Tract Disease - At all times, you should handle a tortoise as if it has URTD, and in such a way that you will not transmit the disease from one tortoise to another. Much of the following information was developed by Dr. Kristin Berry (Berry 1993, 1988).

B.6.a.ii.(a). Treating clothing - Do not allow a tortoise to contact your clothing. If it does, change your clothes before handling another tortoise. Contaminated clothes should be washed before you wear them again while handling tortoises. It is advisable to have a change of clothes on-hand. Change your clothes, including your shoes, before leaving the site for another geographical region; (e.g., another valley or mountain range would be considered a separate region). Dipping the bottoms of your shoes into a sterilizing solution [section *B.6.a.ii.(d).*] or wiping them with a rag dipped in the solution may be sufficient for the shoes to be worn at another location. When visiting multiple sites on a single trip, always visit sites with known occurrence of URTD last. This will minimize the probability of spreading disease.

B.6.a.ii.(b). Treating vehicles - The USFWS recommends that you wash vehicle undercarriages and tires prior to traveling from a site where URTD is known or expected to occur to a site where URTD has not been reported. With appropriate planning, you should be able to accomplish this task.

B.6.a.ii.(c). Treating processing implements - The tips of calipers, which contact tortoises during shell measurements (section *B.7.h.*), may be covered with material to avoid direct contact with a tortoise and therefore contamination of the calipers. However, as with all other implements not directly contacting a tortoise, handling a tortoise, then handling the calipers results in contamination, and we believe that the instrument should be sterilized even if the tips are "protected." Alice Karl, who has handled tortoises for many years, only touches a tortoise with one hand, leaving the other one free and uncontaminated to handle the implements and record the data (personal communication, 6 August 1993). In such a case, the covered caliper tips are sufficiently protected. A metal or plastic rule may be used to measure the plastron (section *B.7.h*), but do not use wooden rules, which are too porous and cannot be properly sterilized. Although using a file to notch tortoises is not used for construction monitoring, if a researcher uses this technique (only with prior approval from the USFWS), the file should also be sterilized before use on another tortoise.

B.6.a.ii.(d). Sterilizing solutions - The USFWS requires that you sterilize all materials that contact a tortoise in one of the following solutions: (a) 95% isopropyl alcohol, (b) 95% ethyl alcohol, or (c) 25% solution of chlorine bleach and water. However, given that the organism is now known to be a mycoplasma, Berry (personal communication, 1 March 1994), citing discussions with Dr. Elliot Jacobson, indicated that of these three solutions, only bleach would be effective against the organism. All implements should be soaked in the solution for at least 20 minutes prior to using them on a different tortoise.

B.7. Processing tortoises

Processing a tortoise (i.e., weighing, measuring, sexing, and photographing it) should only be done by experienced monitors. If you have never handled or processed a tortoise, we recommend that you obtain experience before doing so in the field. Careful practice on pet tortoises, or observing more experienced biologists handling tortoises in the field, are recommended. Experts say that with practice you should be able to process a tortoise in 15 - 20 minutes. We do not recommend that you process a tortoise if the temperature is too hot, or if there is a chance that a second tortoise may be endangered while you are processing the first one. If processing a tortoise will endanger it or other tortoises, or if you have little or no experience in processing tortoises, skip this section and continue with section **B.8.**

B.7.a. Maintaining sterile conditions - Before touching a tortoise, the USFWS requires that you put on clean latex disposable gloves, and that you have them on during the entire process. Even if you do not process the tortoise, but only move it out of harm's way, you should wear gloves. We recommend that if a glove is torn while handling the tortoise, which is likely when its toenails scrape the glove, you should put a new glove on over the torn one. Once used, disposable materials such as latex gloves, t-shirt bags, or surveyor's tape (section *B.7.b.*) must be disposed of promptly. We recommend that each monitor have a garbage bag on hand, and that disposable materials be placed in the bag immediately after use. For non-disposable materials, the USFWS requires that each item be sterilized before it is used on a separate tortoise [section *B.6.a.ii.(c).*]. Additional recommendations and USFWS requirements are given in subsections of section *B.6.a.ii.*

B.7.b. Weighing tortoises - If the situation allows, you may weigh a tortoise. Experts recommend weighing a tortoise immediately after it is removed from the burrow. This way you have a true weight should the tortoise void its bladder, and can weigh it afterwards to determine how much fluid has been lost. One reason for weighing a tortoise is to determine if it is underweight, which may be one sign that it has URTD or another disease.

B.7.b.i. Using spring scales - If you are using a spring scale, a plastic grocery bag, cotton string, or surveyor's tape may be used to suspend the tortoise from the scale. If you use string or surveyor's tape as a sling, be sure that the material is strong enough to support the tortoise. The tape may be doubled for use with very heavy tortoises. Smaller tortoises may be placed inside a grocery bag or ziplock bag and weighed. Larger tortoises can be weighed by making a sling with one loop of the bag placed posterior to its forelimbs and the other loop placed anterior to its hindlimbs. Never suspend a tortoise far from the ground; suspend the tortoise over sand rather than large rocks; keep weighing time to a minimum; and take every precaution to prevent the tortoise from falling.

The following scale sizes are recommended: (a) 0 to 100 g scale with a 1.0 g precision for small tortoises, (b) 1 kg scale with a 10 g precision for moderate-sized tortoises, and (c) 5 kg scale with a 50 g precision for large tortoises. *Pesola* brand spring scales have been recommended. It is best to use the smallest scale that will accommodate the weight of a tortoise. Occasionally a tortoise will weigh more than 5 kg; mark that information on the data sheet. Keep scales clean. When weighing a tortoise, hold the ring at the top of the scale to ensure that the scale is suspended vertically and the correct weight is being taken. Record the information on the data sheet. Note: Some researchers use electronic *Mettler* scales or *Chantillon* balances for more accurate weights.

B.7.c. Immobilizing tortoises

B.7.c.i. Using coffee cans - A desert tortoise may be placed on the top of a coffee can or other large can to facilitate observations and measurements as described in the following sections. The can should be large enough to support the tortoise and small enough to prevent any waving appendages from touching the can. (Note that coffee cans come in several sizes and can be "nested" in one another for ease of transport and for handling different-sized tortoises). Freedom to move its appendages may encourage a tortoise to extend its head, which allows you to observe the eyes, nares, chin glands, and beak where most signs of URTD are observed. The can must be sterilized before using it with another tortoise, or you may place waterproof plastic, such as a baggy, on top of the can, the tortoise on top of the plastic, and discard the plastic afterwards.

B.7.c.ii. Using towels - A tortoise may be held on a clean cloth between your knees as you kneel. Use your body to shade the tortoise during processing. You may scrape away the hot, upper surface of the soil down to a cooler level onto which you can place the towel and the tortoise. While holding the tortoise firmly between your knees, carefully press down on its back to immobilize it. The cloth prevents direct tortoise contact with your clothing, but may not prevent urine or nasal exudate from soaking through the towel and contaminating your clothes. If this happens, you should change your clothes before processing another tortoise. In either case, the cloth must be soaked in a disinfecting solution and laundered before it can be used on another tortoise. Disposable baby changing sheets have been suggested in place of cloth towels.

B.7.d. Observing tortoises - If the situation allows, we recommend that you observe a tortoise and record ectoparasites, shell lesions, signs of osteoporosis or osteomalacia, injuries, and evidence of URTD. Much of this information is taken from Berry (1993, 1988).

B.7.d.i. Ectoparasites - Potentially encountered parasites of tortoises include adobe tick (*Ornithodorus turicata*), mites (*Trombicula* sp.), and bot fly larvae (Family: Cuterebridae). In some areas, ticks are the most common parasite observed on wild tortoises. They generally adhere to the growth areas between scutes, particularly on rear marginal scutes. If present, mites will be found on the skin. Bot fly larvae would appear as a large swelling or bulge (1.0 - 1.5 cm long) on the neck, leg, or tail. There will be a small hole through which you may observe the larva. Experts recommend that you do not try to remove parasites. Such unnecessary handling would likely injure and/or stress the tortoise. We recommend that the numbers and locations of each parasite be recorded on the data sheet.

B.7.d.ii. Shell lesions - There are many types of lesions, ranging from injuries caused by predators to diseases of scute and bone. The field worker should look for and record any observations on scute and bone irregularities, discoloration, apparent damage (healed or healing), open wounds, holes, pits, etc. Since we do not know much about shell diseases in the desert tortoise at this time, photographs and written descriptions will be very useful. See section **B.7.h.** for taking photographs of plastrons.

B.7.d.iii. Osteoporosis and Osteomalacia - These diseases can manifest themselves to the observer by depressed scutes and/or thinning scutes with exposed bone beneath. Some scute depression and thinning is part of the normal aging process of the shell, or may result from nutritional deficiencies or pathologies. It is recommended that the field worker photograph such conditions and record the information on the data sheet.

B.7.d.iv. Upper Respiratory Tract Disease - Tortoises may have this disease and not show any obvious sign of it. Therefore, **treat every tortoise as if it has URTD to avoid spreading the disease to healthy tortoises**. Observe all tortoises for the following signs of URTD: (a) wheezy, rattling breath; (b) clear to green mucous coming from the nostrils or dirt caked around the nostrils; (c) dirt caked on forelimbs due to mucous being rubbed there; (d) puffy eyes or eyes sunken and dull; (e) swollen, oozing chin glands; (f) lethargic, with legs or head listlessly distended from shell; etc. Very low body weight, lack of skin luster, or a dry mummified appearance may be evidence of URTD or another disease (Kristin Berry, personal communication, 2 February 1994). We recommend that these signs or abnormal behavior be recorded on the data sheet. Photo-documentation of signs of URTD is strongly recommended.

B.7.e. Recording distinctive features - If the situation allows, we recommend that you record on the data sheet diagram any marks or anomalies (e.g., unique morphological features, damaged limbs, damaged shell, manmade marks on the shell, etc.). Captive tortoises may be marked with paint, have initials carved in their carapaces, have holes drilled in their marginal scutes, or have raised centers on their carapace scutes due to abnormally high growth rates. Some anomalies may include irregular gulars, extra vertebral scutes (normal is five), paired or malformed costal scutes (normal is four on each side), extra marginal scutes (normal is 11 on each side), or missing scutes. There may be too many or too few toes, or malformed toe nails. We recommend that you describe a tortoise in enough detail that another monitor would recognize it from your description. This information may be important to distinguish "problem" tortoises that persistently enter construction sites.

B.7.f. Sexing tortoises - If the situation allows, we recommend determining the sex of a tortoise if its midline carapace length (MCL) is greater than or equal to 180 mm (section *B.7.h.*); the sex of smaller tortoises is not easily, if at all, determinable. If the MCL is less than 180 mm, mark "sex unknown" on the data sheet. Generally, the following **male** characteristics may help differentiate them from females: (a) concave plastron; (b) longer, more curved gulars; (c) larger size; (d) longer, broader, more conical tail; (e) shorter, thicker toenails; and (f) larger, well-developed chin glands. For less experienced monitors, pay particular attention to the gular projection and the shape of the plastron, which are the two best characters for differentiating the sexes. For very large tortoises, you can feel the concave (male) or flattened (female) plastron or see it by holding the tortoise at eye level without turning the tortoise over on its back. When in doubt, record all other information and mark "sex unknown" on the data sheet.

B.7.g. Marking tortoises - If the situation allows and if you are required to mark a tortoise by painting an identification number on a scute, we recommend the following. Use a clean, sterile toothbrush to remove dirt from the left fourth costal scute, where the tortoise will be marked. If this scute is damaged, use the right fourth costal scute. The number is likely to last longer if placed on a rough, off-centered surface where shell-wear is less common, which is one reason only the fourth costal scutes are used for marking. Next, place a small dot (i.e., no larger than 1/4 inch diameter) of "white-out" or acrylic paint on the scute. Once the spot is dry, write the pre-arranged number on the spot using a waterproof, permanent black ink pen. Some biologists recommend using a capillary type technical pen with a point diameter of about 0.25 mm.

Allow the number to dry before applying epoxy. Devcon brand, five-minute epoxy has been recommended by some field-workers. It is advisable to mix the epoxy on a file card or piece of paper, then transfer the mixed epoxy to the number on the shell with something such as a toothpick, wooden coffee stirrer, or tongue depressor. Wait several seconds until the epoxy starts to thicken but is still liquid enough to spread over the numbered spot with ease. Cover the paint spot overlapping its edges just enough to seal the paint. **Never allow the epoxy to spill over onto the growth area, which occurs at the border between two scutes.** Anticipate this when applying the paint so there will be space for the epoxy to overlap the paint without entering the seams. It may be helpful to cover the margins of the scute with 1/2" wide masking tape before applying the epoxy, to ensure that the epoxy does not touch the growth area, especially on smaller tortoises. Record the assigned number on the data sheet.

B.7.h. Measuring tortoises - If the situation allows, while the epoxy is drying (be careful to avoid smearing the epoxy), we recommend that you measure the tortoise and record the following information on the data sheet: (a) carapace length at the midline (MCL), (b) plastron length from the gular notch to the anal notch (PLN), (c) width at the junction of the seventh and eighth marginal scutes (Width M7/M8), and (d) maximum height from the intersection of the abdominal and femoral scutes (i.e., at the junction of the two largest scutes on the plastron and the two immediately posterior) to the corresponding position on the carapace (Max height). The USFWS requires that all measurements be in millimeters. Use calipers for the most accurate measurements, or a plastic/metal rule as an alternative.

While taking measurements, tortoises are to be handled carefully. Do not turn the tortoise over to measure its plastron. This measurement can be made with the tortoise in an upright position. Mishandling may result in pulmonary edema, psychogenic shock, or intestinal torsion. If eggs inside a female are broken while you are handling her, she may die from egg yolk peritonitis.

B.7.i. Photographing tortoises - If the agency requires that you photograph processed tortoises, we recommend that you take the following color, **slide** photographs: (a) dorsal view of the carapace, (b) ventral view of the plastron, (c) the numbered scute, and (d) frontal view of the tortoise's face and forelegs. If the tortoise is too large for you to hold while taking a photograph of the plastron from the underside, do not take this photo. If present, have another monitor hold the tortoise while you take the plastral photograph. It is important that each object fill 80 - 90% of the frame and that the object be clearly focused. Kodachrome film has been suggested because the slides last longer with less discoloration than Ektachrome, for example. We recommend that the following information appear in the photograph: date, biologist's name, project name, and tortoise number. Two types of labels have been recommended:

(a) hold a small card adjacent to the tortoise so that the above information is clearly visible on the photograph without blocking the part of the tortoise being photographed; or,

(b) attach a 1/2" x 1/2", adhesive "Avery label" to the tortoise to allow for closer, more detailed photographs of the subject.

It is suggested that you keep a log of the photographs in your field notes (e.g., "Roll 1, Slide 23, carapace of Tortoise 4.") If you are inexperienced with photography, we recommend that you not photograph tortoises. If you are only somewhat experienced, we recommend that you shoot several test rolls of film prior to photographing tortoises in the field. Use only camera settings that produce the clearest slides. If available, we recommend that a second monitor take the photograph while you, the processor, hold the tortoise. We recommend that processed slides be labeled with the following information: date, biologist's name, project name, tortoise number, township, range, section, county, and state.

B.8. Releasing tortoises

B.8.a. Translocating tortoises - Once a tortoise has been processed, or moved out of harm's way, do not move the tortoise more than 1,000 feet from the collection site unless otherwise directed by the USFWS. You should carefully consider the situation before you release tortoises (section *B.5.c.ii.*). The minimum distance from the edge of the construction zone that a tortoise can be translocated will be determined by its age and sex (different home range sizes), the presence or absence of tortoise-proof fencing around the perimeter of the construction zone, and the duration of the construction activity. The USFWS has required that tortoises removed from construction sites be placed in the shade of a shrub, in a natural unoccupied burrow, or in an artificial burrow (section *B.5.*). We do not recommend that tortoises found aboveground be placed inside an artificial burrow, but rather released as described elsewhere (section *B.8.b.*). Further, the DTC recommends that tortoises **not** be put into existing burrows for reasons given in section *B.5.e.* A tortoise should not be placed on private land without the written permission of the landowner.

B.8.b. Releasing tortoises

B.8.b.i. Temperature considerations - The USFWS requires that tortoises be released at a temperature that is suitable for activity, with reasonable expectation that the temperature will remain within the tortoise's thermal preference long enough for it to adjust to its surroundings. McGinnis and Voigt (1971) found the preferred daytime body temperature of tortoises to be 80.6 °F to 100.4 °F during July, and somewhat lower during May (section *B.5.c.*). Some situations and recommended procedures are given in section *B.5.c.ii.*

B.8.b.ii. Discouraging urination - Many experts state that tortoises are most likely to urinate while being carried, and that the longer you handle them, the more likely they are to urinate. A tortoise may be more prone to void its bladder during drought conditions, which is also when water availability is at its lowest. You may discourage bladder voiding by pressing the tortoise's tail against its vent while you are carrying it. Also, press the tail against its vent if it starts to urinate. If it

does, record on the data sheet the quantity, color, and viscosity of the urine. If the tortoise has already been weighed, weigh it again to estimate the amount of lost fluid.

B.8.b.iii. Monitoring released tortoises - Upon releasing a tortoise, the USFWS requires: (a) that each tortoise be accompanied by an authorized monitor, (b) that each tortoise be monitored at the release site until it is exhibiting normal behavior, and (c) that there be no mass releases of animals.

C. FOLLOW-UP SUGGESTIONS

C.1. Caring for field supplies

Some of the materials you may use are very sensitive to desert conditions. Spring scales will register incorrect weights if they become clogged or rusty; surveyor's tape may become brittle and not support the weight of a tortoise; masking tape will dry up and be useless. It is best if you have well-maintained materials for handling tortoises. Non-disposable materials should be cleaned and sterilized between uses on different tortoises, and may need to be cleaned before using them at the beginning of a project if they have not been used in a long time. Care for field materials is equivalent to the care you can offer a desert tortoise.

C.2. Information sharing

The USFWS typically requires a follow-up report to construction projects authorized by their Biological Opinions. We recommend that each project be considered an opportunity to provide information to the resource agencies on the best ways to accomplish tortoise monitoring. We feel that a consistent approach to handling and processing tortoises and recording the data will ultimately benefit the conservation effort for the species. The DTC is very appreciative of the many individuals, representing many organizations, who have already shared information to develop these Guidelines. Their names are listed in Attachment 1, and they are to be commended for their invaluable input.

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DATA SHEET FOR HANDLING DESERT TORTOISES

Complete both sides of this data sheet when either a tortoise is moved out of harm's way, or a burrow is excavated and a tortoise found.

Project Identification

Date:_____ Project Name:_____ Monitor's Name(s)_____

Location: State:_____ County:_____

USGS quadrangle:_____ T:_____ R:_____ 1/4 of_____ 1/4_____

Comments:_____

Project Description

Slope:_____ Aspect:_____ Elevation:_____

Topography	Soil Type	Vegetation	Location found
_____ Flat	_____ Sandy loam	_____ Creosote bush	_____ Burrow
_____ Small hills	_____ Blow sand	_____ Saltbush scrub	_____ Pallet burrow
_____ Large hills	_____ Gravel	_____ Blackbrush	_____ Other
_____ Small wash	_____ Cobble	_____ Desert wash	_____ Under shrub
_____ Large wash	_____ Caliche	_____ Joshua tree	_____ In open
_____ Bajada	_____ Rocky	_____ Thorn scrub	_____ Caliche cave
_____ Dune	_____ Pavement	_____ Grassland	_____ Rock shelter

Describe:_____

_____

_____

_____

Tortoise Burrow Data

Time of excavation: Start:_____ End:_____ Burrow #: _____

Temperature during excavation (1.5m/1.0cm): Start:_____ End:_____

Burrow: Width:_____ Height:_____ Length:_____

Orientation:_____ Condition:_____

Burrow description/contents:_____

_____

_____

_____

TORTOISE MEASUREMENTS AND OBSERVATIONS

Tortoise #:_____ Numbered Scute:_____ Tortoise Weight (g):_____ Sex:_____

Measurements (mm): MCL:_____ PLN:_____ Width M7/M8:_____ Max Height:_____

Photos Taken: Carapace:_____ Plastron:_____ Frontal:_____ Numbered Scute:_____

Comments:_____

_____

Tortoise Health Profile (indicate the best description with an "x" in the appropriate space).

Nasal Description	**Breathing**	**URTD Determination**
_____ Nostrils dry	_____ Clear	_____ Sufficient sign present
_____ Nostrils damp	_____ Wheezing	_____ Insufficient sign present
_____ Nostrils wet	_____ Rasping	_____
_____ Nasal exudate present	_____ Bubbly	_____
_____ Bubbles from nostrils	_____ Normal	_____

Describe:_____

_____

Posture and Behavior	**Shell Disease***	**Trauma***
_____ Alert, responsive	_____ Lesions present	_____ Head
_____ Lethargic	_____ Sunken scutes	_____ Forelimbs
_____ Appendages limp	_____ Thinning scutes	_____ Hindlimbs
_____ Head hanging	_____ None observed	_____ Shell, gular horn

Describe:_____

_____

* Sketch all features mentioned above, including the epoxied number, gular horn, anomalies, and other identifying features.

F. CHECKLIST FOR HANDLING DESERT TORTOISES

The following sequence is recommended for handling and processing tortoises. If this differs from an established sequence that you, as an experienced monitor, have developed, the DTC does not require that you abandon your approach, but that you consider the information. For the inexperienced monitor, we **do** recommend that you follow this sequence. Each step is cross-referenced with sections in the Guidelines. See the Table of Contents for page numbers. The bold word, "**data**," follows a given instruction where we recommend information be recorded on your data sheet, maps, or personal journal.

Before going to the field, be authorized (A.1.) and trained (A.2.), determine if tortoises are to be marked (A.3.), if so, develop a numbering scheme (A.4.), and have your materials organized (A.5.).

Upon finding a burrow, determine if it will be excavated (B.1.a.). If so, describe it beforehand (B.1.b. **data**) and decide if an artificial burrow is needed (B.1.c.). Map (B.2. **data**) and number (B.3. **data**) excavated and artificial burrows.

Before excavating a burrow, check for eggs (B.4.a.) and, if found, follow USFWS protocol for handling them (Attachment 3). Then, excavate the burrow (B.4.b.) and be absolutely sure that it is empty or that you have removed all tortoises (B.4.c.).

When you find a tortoise in a burrow, take the temperature (B.5.a. **data**) and decide if the tortoise should be processed (B.5.b. and B.5.c.).

Before you handle a tortoise, determine if it will be processed and how it will be disposed during hot temperatures [B.5.c.ii.(a).], during cold temperatures [B.5.c.ii.(b).], at or near sunset [B.5.c.ii.(c).], if the tortoise is seriously ill [B.5.c.ii.(d).], or during other situations [5.c.ii.(e).]. If the tortoise must be transported in a vehicle, use a new cardboard box (B.5.d.i.) and take precautions (B.5.d.ii.).

If an artificial burrow needs to be constructed (B.5.e.), use either the traditional method (B.5.f.i.) or another acceptable method (B.5.f.ii.). Take every precaution to ensure that the tortoise, if blocked in its burrow, is unblocked after several days (B.5.f.iii.).

When removing a tortoise from its burrow, avoid hyperthermia (B.6.a.i.), and take precautions to prevent the transmission of URTD (B.6.a.ii.) with proper treatment of clothing [B.6.a.ii.(a).], vehicles [B.6.a.ii.(b).], and processing implements [B.6.a.ii.(c).], using appropriate sterilizing materials [B.6.a.ii.(d).].

If the tortoise is to be processed, put on disposable gloves and maintain sterile conditions (B.7.a.), weigh the tortoise (B.7.b.i. **data**), immobilize it using a can (B.7.c.i.) or a towel (B.7.c.ii.), observe it for ectoparasites (B.7.d.i. **data**), shell lesions (B.7.d.ii. **data**), osteoporosis and osteomalacia (B.7.d.iii. **data**), and URTD (B.7.d.iv. **data**). Record distinctive features (B.7.e. **data**), sex the tortoise (B.7.f. **data**), mark it (B.7.g. **data**), measure it (B.7.f. **data**), and photograph it (B.7.i. **data**).

After the tortoise has been processed, release it into the adjacent area or place it in the artificial burrow (B.8.a.). Be careful of temperature extremes (B.8.b.i.), discourage tortoise urination (B.8.b.ii.), and monitor the tortoise (B.8.b.iii.).

After you leave the field, maintain your field materials in good working order (C.1.), and share your experiences with the USFWS (C.2.).

ATTACHMENT 1: PERSONS CONTACTED

Edward L. LaRue, Jr. assembled the information and drafted the Guidelines in 1994, and, with input from USFWS field offices in California, Arizona, Nevada, and Utah, revised them in April 1996 and again in July 1999. The following individuals were contacted to develop and/or review preliminary drafts. Not all of them responded to the initial or subsequent requests for information. For those who did, thank you very much for your invaluable assistance. When known, contributors' July 1999 affiliations are given rather than their 1994 affiliations. Tierra Madre Consultants, Inc. is given special thanks for its commitment to this project, and for much of the funding to complete it.

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ATTACHMENT 2: HANDLING SUPPLIES

Burrow excavation and construction
Thermometer (to measure air and ground temperatures)
Watch or clock (to record start and finish processing times)
Measuring tape (for burrow dimensions)
Compass (for burrow orientation)
Hand held mirror (for viewing inside burrow)
Leather or cloth gloves (to avoid animal stings and/or bites)
Blunt-nosed shovel(s) (for excavating burrow)
Garden trowel (for excavating burrow)
1" x 2" plank (to insert in small burrows)
2" x 4" plank (to insert in larger burrows)
4' x 8' x 1/4" thick plywood (for artificial burrow construction)
Hand saw (to cut plywood into appropriate size and shape)
Surveyor's tape (for marking a burrow or making a weighing harness/sling)

Tortoise handling and marking
Disposable latex gloves (for handling tortoise)
Different sizes of coffee cans/sterilized towel (for immobilizing tortoise)
Toothbrush, sterilized (for cleaning dirt from scute to be numbered)
Acrylic paint or typewriter correction fluid (for making dot to number tortoise)
Waterproof, capillary pen (for numbering the tortoise and keeping notes)
1/2" masking tape (to cover growth areas prior to applying epoxy)
Epoxy, toothpicks, wooden coffee stirrer, tongue depressors (to cover the number on the scute and to apply the epoxy)
Plastic, ziplock bags (for holding used latex gloves and weighing juvenile tortoises)
Hand lens (for observing parasites)
95% ethyl or isopropyl alcohol, or 25% chlorine solution (for sterilizing equipment)
Rubber/plastic container and lid (for soaking instruments)
New, disposable cardboard boxes (for holding and/or transporting tortoises)
Garbage bags (for disposing of used gloves, t-shirt bags, etc.)

Tortoise measurements and photography
Grocery, t-shirt bags, surveyor's tape, cotton string (to weigh the tortoise)
Calipers (for measuring carapace length, width, and height)
Metal or plastic rule (to measure plastron length)
100 g, 1.0 kg, and 5.0 kg tubular spring scale (to weigh small and large tortoises)
3" x 5" file cards (for mixing epoxy and identifying photographic slides)
Avery labels or other stickers (to attach to tortoise to identify photograph)
35 mm camera (for taking photographs)
Slide film (for taking photographs)

Egg handling
Felt-tipped pen (for marking eggs)
Bucket (for transporting eggs)

Miscellaneous
Agency document(s) regulating the specific project (e.g., USFWS Biological Opinion, State Memorandum of Understanding, BLM Stipulations, etc.)
Handling Guidelines and checklist
Agency approved, sequential numbering scheme for marking tortoises
Project maps for mapping tortoise burrows
Clipboard
Data sheets
Pads or blanket for truck bed to cushion transported tortoise and reduce heat
Phone number and contact person of local USFWS field office, State fish and game departments, BLM field office, etc.
Phone number of nearest qualified veterinarian to treat injured tortoise
Extra change of clothing, including extra shoes

(Much of this list is taken from McCullough et al. 1993)

ATTACHMENT 3: EGG HANDLING PROTOCOL

This Egg Handling Protocol is taken verbatim from U.S. Fish and Wildlife Service File No. 1-5-93-TA-390. Wording concerning placing eggs on private lands was added to be consistent with USFWS recommendations for the Tortoise Handling Guidelines.

Tortoise eggs shall be moved to artificial nests either in the wild or at an approved facility. Biologists must receive special training in the procedures outlined below, but such training can be obtained after a nest is actually found. If this is done, the nest shall be carefully covered with soil so as not to move the eggs and protected until on-site training is provided. The responsible federal agency shall ensure that this training is made available.

Any nest that is found shall be carefully excavated by hand at a time of day when the air temperature six inches above the ground is approximately equal to the soil temperature at egg level. Immediately upon finding a nest, large tool use shall be discontinued and the nest excavated by the biologist using his or her hands. [DTC recommends that the monitor put on disposable latex gloves before marking and handling eggs]. Before disturbance of nest contents, each egg shall be gently marked with a small dot on the top using a felt-tipped pen to establish the egg's orientation in the nest. In handling nest contents, eggs must be maintained in this orientation at all times. Because egg shells become extremely fragile in the last few weeks before hatching, special care shall be taken with eggs found from August to mid-October. Because these eggs are very fragile, some may break during handling. This will be lethal to egg contents. Such an accident can be expected to occur until techniques are developed to avoid this type of incident. Broken eggs shall be buried nearby and left in the field, or the contents preserved and provided to qualified researchers.

The biologist shall measure and record the depth of the nest below the soil surface, the location of the nest in relation to any adjacent shrub (i.e, whether on the north, south, east, or west side of the shrub), the species of shrub and its approximate foliage volume, and the soil type. Place approximately 1 inch of soil from the nest area in a bucket and carefully transfer the eggs to the bucket, maintaining egg orientation. Cover the eggs with soil that is free of cobbles and pebbles, to a depth equivalent to that of the original nest.

If good tortoise habitat is available in the general area, the eggs shall be relocated between 150 to 1,000 feet from outer boundary of the project site, unless directed differently by USFWS. [Eggs should only be placed on lands administered by a federal agency, or on private lands when a written authorization to bury the eggs there has been obtained]. Prepare a nest with the same depth, orientation, location in relation to a specific shrub species, and in the same soil type as the original nest. Carefully transfer the eggs, maintaining their original orientation, to the new nest. The eggs shall be replaced so that they touch one another. Gently cover with soil from which cobbles and pebbles have been removed so that all the air spaces around the eggs are filled. Relocated nests in the wild shall be monitored by a qualified biologist. The monitoring program shall be developed in consultation with the Fish and Wildlife Service.

If a suitable site for a nest is not available in the wild, the eggs shall be prepared for incubation in a suitable holding facility. Place a small amount of soil in a bucket and transfer the eggs to the bucket using the technique specified above, making sure that the eggs are touching one another. Carefully fill the bucket to the depth of the original nest, but leave the top of the soil layer three inches below the rim of the bucket so that future hatchlings cannot escape. Bury the bucket in soil in a safe location at an approved holding facility.

The biologist shall record in detail all the procedures used in moving eggs. Personnel caring for incubating eggs at a facility shall maintain a record of where the eggs were found, method of incubation, length of time and conditions under which the eggs were incubated, observations of eggs during the incubation period, information about hatchling health and behavior, and disposition of the hatchlings.

Attachment DR-BIO-55

Common Raven Monitoring, Management and Control Plan

RIDGECREST SOLAR POWER PROJECT
DRAFT
COMMON RAVEN MONITORING, MANAGEMENT AND CONTROL PLAN
RIVERSIDE COUNTY, CALIFORNIA

Docket 09-AFC-09

Prepared for:
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Figure DR-BIO-55 Site Location and Raven Monitoring Areas

1.0 INTRODUCTION

This section introduces the project background, purpose, objectives, and conditions of concern related to raven monitoring, management, and control in the vicinity of the proposed Ridgecrest Solar Power Project (RSPP or Project).

1.1 Background

Ridgecrest Solar I, LLC (hereafter referred to as the Applicant), proposes to construct, own, and operate the RSPP. The Project would have a nominal output of 250 megawatts (MW) and consist of a single power plant utilizing two solar fields.

The RSPP site (Project site) is located in the high northern Mojave Desert in northeastern Kern County, California, about five miles southwest of the City of Ridgecrest, California (Figure DR-BIO-55). The Project right-of-way (ROW), for which the Applicant has applied to the Bureau of Land Management (BLM), includes approximately 3,995 acres of public lands owned by the Federal government. The total disturbance area is estimated at 1,944 acres plus an additional 16.3 acres resulting from construction of the water pipeline off site.

The Project would include two solar fields. The north solar field would be 894 acres and the south field would be 554 acres. The solar fields would be composed of piping loops arranged in parallel groups connected to supply and return header piping. The power block would be located north of Brown Road, just southwest of the northern solar field. The power block would be composed of its own administration, control, warehouse, maintenance, and lab buildings; a heat transfer fluid pumping and freeze protection system; steam generator; propane-fired auxiliary boiler; one steam turbine generator; an air-cooled condenser; generator step-up transformer, transmission lines, and related electrical system; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system).

A water pipeline, approximately 5 miles long, 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 could be 12 inches diameter or smaller depending on the Water District's determination). A new 230-kilovolt (kV) transmission line from the turbine generator to a new nearby switchyard would interconnect with Southern California Edison's existing 230-kV Inyokern/Kramer Junction transmission line passing west of the Project site. The transmission line would be approximately 0.75 mile long and located entirely within the facility footprint.

In addition to the solar fields and a main power generating facility (power block), the site would include a main office building and parking lot, a main warehouse with lay down area, on-site access roads, a tie-in switchyard, an underground water pipeline, and a bioremediation area. The Project site plus the linear facilities (water pipeline, transmission line and switchyard) are hereinafter collectively referred to as the Project Area.

Without the implementation of monitoring, mitigation, and control measures, the Project has the potential to indirectly impact populations of the desert tortoise (*Gopherus agassizii* [DT]), listed as threatened under the federal Endangered Species Act (ESA) and California ESA, by increasing the attraction of common ravens (*Corvus corax*) into the area and thereby increasing potential DT depredation by raven. The majority of the proposed disturbance area is sutiable DT habitat, though none of this habitat is in a DT conservation area or is designated DT critical habitat (BLM 1999). The movement of ravens throughout the area and over DT habitat adjacent to and in the vicinity of the disturbance area could increase the chances of a raven encountering and depredating a DT.

1.2 Purpose and Objectives

The purpose of this Common Raven Monitoring, Management, and Control Plan (Plan) is to ensure that the construction, operation, maintenance, and decommissioning of the RSPP does not attract ravens to the Project Area by creating food or water subsidies, perch sites, roost sites, or nest sites, and to identify the conditions of concern specific to the RSPP that may attract ravens to the Project Area. The Plan includes monitoring, management, and control measures that will 1) monitor raven activity and 2) specify management and control measures that will avoid, minimize, or mitigate impacts. The monitoring effort is intended to provide qualitative data that can be interpreted by the Designated Biologist (DB) (see Section 3.2) to determine if Project Design Features (PDFs) are effective or if additional management and control measures are needed to meet the objective.

Specific plan objectives include:

1. Clearly identify how the Project would utilize PDFs and other measures to manage the conditions of concern specific to the RSPP that may attract ravens to the area.
2. Document the effectiveness of PDFs and other measures in addition to raven management and control measures implemented at the RSPP.
3. Specify how, when, and what other measures would be selected and implemented if the monitoring suggests the need for additional controls.
4. Define triggers for modification of management and control measures using adaptive management principles.

1.3 Conditions of Concern

The conditions of concern are those Project features or activities that, when not properly designed or managed, provide new subsidies that may result in changes in raven population or behavior that could potentially adversely affect the DT population in the Project Area. Four basic conditions of concern have been identified for the RSPP and have been considered in developing this Plan:

1. Potential creation of new perching/roosting/nesting sites for ravens;

2. Water ponding potential from dust suppression;
3. Raven food sources from soil disturbance (e.g., rodents, insects, etc.); and,
4. Human food and waste management.

The study design for raven monitoring, as well as measures for raven management and control, is dependent upon the accuracy of defining these conditions. Each of these conditions of concern is defined in more detail below.

Raven Perching, Roosting, and Nesting Sites

The majority of raven predation on DT is thought to take place during the spring, most likely by breeding birds that have been shown to spend most of their time foraging within 1,300 feet of their nests (Kristan and Boarman 2003). Therefore, structures that facilitate nesting in areas ravens could not otherwise nest in may pose a danger to nearby DT populations. Project components, such as tower structures, transmission poles and lines, and support structures provide new elevated perching sites that have the potential to increase raven use of the Project Area.

Ponding Water

During construction, water will be applied to graded areas, construction ROWs, dirt roads, trenches, spoil piles, and other areas of ground disturbance to minimize dust emissions and topsoil erosion. If water resulting from these dust suppression activities were to form ponds, those ponds would have the potential to attract ravens and increase DT predation by ravens. During operations, deionized water will be used to wash mirrors; however, the amount of water used will be minimal and is not anticipated to result in ponded water on site.

Raven Food Sources from Soil Disturbance

During construction, decommissioning, and restoration, disturbance of the soil would occur from heavy equipment operation. This disturbance would result in the "unearthing" and exposure of natural food sources for ravens such as rodents and insects. Ravens would be attracted to the soil disturbance areas to prey on unearthed, injured, and dead animals.

Human Food and Waste Management

Ravens are considered scavengers that obtain a high percentage of their diet from human subsidies such as food sources brought on site by employees, landfills, dumpsters behind restaurants and grocery stores, open garbage drums and plastic bags placed on the curb for garbage pickup, and roadkill. In addition, construction waste piles also attract small mammals (e.g., rodents) that become an additional food source for ravens. The construction, operation, decommissioning, and restoration phases of the RSPP would result in increased food and waste generation in the Project Area; improper waste management could attract ravens.

2.0 REGION-WIDE RAVEN MANAGEMENT AND MONITORING PROGRAM

The Applicant will participate in a regional raven management and monitoring program. As specified by the California Energy Commission (CEC) for other ongoing solar power projects in the region, this program will include agreements with State and local governments and the Applicant (Beacon 2008). Pursuant to this program, the Applicant will contribute to the region-wide effort in an amount related to the anticipated level of the Project's adverse impacts to DT from predation by ravens. It is anticipated that the funds contributed by the Applicant would be held by the National Fish and Wildlife Foundation as part of a Desert Conservation Fund until needed to implement the region-wide program. The Applicant will contribute funds necessary to avoid, minimize, and mitigate potential impacts to DT resulting from increased raven predation associated with the RSPP.

3.0 ROLES AND RESPONSIBILITIES

3.1 Environmental Compliance Manager

The Applicant shall assign an Environmental Compliance Manager (ECM) to the Project. The ECM is responsible for facilitating implementation of the environmental conditions of the Project. Typical ECM duties involve managing, supervising, and/or providing advice on work affecting air quality, water/streambed permits, and biological resources environmental compliance programs. The contact information for any ECM named to oversee the Project will be incorporated into the Final Biological Resources Mitigation, Implementation, and Monitoring Plan.

The ECM must have experience in the implementation of general environmental compliance measures and must have specific training by the DB to conduct biological monitoring activities specified in this Plan.

3.2 Designated Biologist

The Applicant shall assign a DB to the Project. The Applicant shall submit the resume of the proposed DB, with at least three references and contact information, to the CEC Compliance Project Manager (CPM) for approval in consultation with the California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USFWS).

The DB will have the following background and training:

- Bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field, and three years of experience in field biology or current certification of a nationally recognized biological society, such as the Ecological Society of America or the Wildlife Society; and
- At least one year of field experience with biological resources found in or near the Project Area.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM, in consultation with the CDFG and USFWS, that the proposed DB has the appropriate training and background to effectively implement the Plan. The Applicant shall ensure that the DB performs the activities specified in the Plan.

The Applicant shall also designate an alternate biologist with the same qualifications as the DB, outlined above.

4.0 MANAGEMENT PRACTICES

This section specifies management practices or PDFs that the Applicant proposes to implement to accomplish the purpose of this Plan as identified in Section 1.2. The PDFs are designed to avoid creation of new subsidies and thus prevent the increased use of the Project Area by ravens. The four basic conditions of concern identified in Section 1.3 have been grouped into construction and operation phase conditions, as appropriate for the Project. Construction-phase conditions are considered temporary and are anticipated to be avoided or minimized mainly by the implementation of management measures as defined in Section 4.1 below. Operation conditions will include management measures to minimize potential impacts and may require additional control measures based on the results of the monitoring program (Section 4.2). If these PDFS or management practices are not effective in accomplishing the goal of this Plan, modifications to these practices and/or additional measures will be implemented and monitored under adaptive management to ensure the Plan's purpose is satisfied.

4.1 Construction

Construction-phase impacts are considered more temporary in nature than operational impacts and therefore require temporary management practices to avoid or minimize the potential to attract ravens to the Project Area. Construction-phase impacts will also occur during the decommissioning and restoration phases of the RSPP.

4.2 Raven Perching, Roosting, and Nesting Sites

Construction activities may create temporary perch, roost, or nest sites for ravens by introducing equipment or materials to the landscape that provide height for ravens.

Weekly monitoring will evaluate the presence of ravens during construction. If ravens are identified perching, roosting, or nesting on building materials, equipment, waste piles, or other construction debris, hazing (described in Section 6.4) will be employed to discourage use.

4.3 Ponding Water

To minimize the occurrence of ponding water, the application rates of water for dust suppression activities will be predetermined to minimize excessive application. The application rate will consider soil infiltration and evaporation rates. The ECM will patrol areas to ensure water does not puddle for long periods (more than 1 hour) and make recommendations for reduced water

application rates where necessary as discussed in Section 6.0 (Adaptive Management). The fill station will be designed to adequately drain water to prevent ponding.

4.4 Raven Food Sources from Soil Disturbance

During construction activities, specifically grading, there is a potential for animals to be unearthed, providing a food subsidy for scavengers and thereby resulting in increased attraction of ravens to the Project disturbance area. Daily observations of the construction site and of access roads will expedite proper disposal of food subsidies to the extent feasible.

4.5 Human Food and Waste Management

A trash abatement program will be established during the construction phase of the RSPP. Trash and food items will be contained in closed, secured containers on the Project site and removed daily to reduce the attractiveness to opportunistic predators such as ravens. Daily observations of the construction site as well as access roads will expedite proper disposal of roadkill. In addition, the Worker Environmental Awareness Program will assist in ensuring that no trash or roadkill is available that might attract DT predators.

4.6 Operations

Operational impacts are considered ongoing and require PDFs and ongoing management practices to avoid or minimize the potential to attract ravens to the RSPP. No soil disturbance is anticipated during operations or maintenance that will result in raven food sources from soil; therefore this condition of concern is not addressed.

4.7 Raven Perching, Roosting, and Nesting Sites

PDFs will be implemented to avoid introducing new subsidies by minimizing the attractiveness of Project components. Potential PDFs that will be considered to reduce impacts from these Project components primarily include the use of physical bird deterrents such as, but not limited to, bird spikes, Bird-B-Gones, and WhirlyBirds. In addition, nest removal will occur in conjunction with monitoring, as discussed below in Section 5.3.

4.8 Ponding Water

To minimize the occurrence of ponding water, the application rates of water for dust suppression activities will be predetermined to minimize excessive application. The application rate will consider soil infiltration and evaporation rates. The ECM will patrol areas to ensure water does not puddle for long periods and make recommendations for reduced water application rates where necessary. During operations, deionized water will be used to wash mirrors; however, the amount of water used will be minimal and is not anticipated to result in ponded water on site. If water should be found to be a concern, changes will be made through adaptive management.

4.9 Human Food and Waste Management

The trash abatement program developed for the construction phase will also include operational measures to be implemented for the life of the Project. Trash and food items will be contained in

closed, secured containers and removed daily to reduce the attractiveness to opportunistic predators such as ravens. The ECM will continue to ensure that these practices are enforced and make recommendations for improvements where applicable as discussed in Section 6.0.

5.0 MONITORING PRACTICES

Semi quantitative and qualitative monitoring will be implemented to assess the efficacy of PDFs and management measures, and to determine the need for implementing additional control measures. These monitoring practices are intended to evaluate the potential impacts that construction and operation may have on raven activity and populations, which could result in potential impacts to DT. Raven monitoring will be implemented in the construction and operation phases of the RSPP. The monitoring program is designed as an observational reconnaissance level study aimed at monitoring the effectiveness of the PDFs and management measures implemented with the goal of avoiding new subsidies for ravens in the Project Area and evaluating the overall effects of the Project and specific Project components (i.e., solar array) on raven activities (e.g., presence or type of activity).

5.1 Construction Phase

To identify potential increases in raven activity, the ECM will conduct at least weekly reconnaissance level surveys in the Project Area. Surveys will focus on all potential subsidies including waste disposal areas, erected structures, staging areas where large equipment or material may be stored, and any area where water is applied to control dust and erosion or there are recent surface disturbances.

Data will be recorded for each raven observed, including activity, categorized as flying, perched, or on the ground (likely scavenging); type of perch (if applicable); and the general location of the bird within the Project Area. In addition, any nesting locations will be recorded and unoccupied nests will be removed (see Section 5.5 for a discussion on nest removal). Data sheets will be developed and submitted to the agencies prior to implementation of this Plan, after final Project design is complete.

5.2 Operation Phase

To identify potential increases in raven activity during operation and maintenance of the RSPP, the ECM, in coordination with the DB as appropriate, will conduct biweekly (i.e., every other week) reconnaissance-level monitoring at the Project site for the life of the Project in addition to annual breeding season raven monitoring at the Project site and all associated aboveground linear components (Figure DR-BIO-55) as discussed below.

5.3 Ongoing Biweekly Raven Monitoring

The ECM, following training by the DB, will conduct biweekly surveys (every two weeks) for raven activity at pre-designated locations throughout the Project Area for the first five years of Project operation, commencing when the Project becomes operational. After the first five years

of Project operation, surveys will be conducted biweekly for one year every five years, unless results indicate more frequent or less frequent monitoring is necessary following completion of the first five years of Project operation. The ECM will be accompanied by the DB during the first four surveys to facilitate appropriate data collection. Survey locations will focus on Project components that may influence raven abundance, activity, and behavior by potentially allowing perching, roosting, and nesting opportunities or by providing supplemental resources such as food and water. These Project components include tower structures, transmission poles and lines, and support structures, as well as waste disposal facilities.

Surveying will occur every other week. Up to five permanent sampling locations in addition to a stationary sampling point will be identified by the DB based on areas that have the greatest likelihood of attracting ravens (e.g., tower structures, transmission poles and lines, and waste facilities).

A five-minute sampling session observing and listening for ravens will occur at each survey location. The surveyor will record raven detections and will document the behavior of the raven (e.g., perched, flying, on the ground, nesting), perch type (if applicable), and distance and direction from the survey location. Additional data collected will include the survey start/stop time, and weather (including temperature, average wind speed, and percent cloud cover). In addition, the location of any nests detected during a survey will be noted and Universal Transverse Mercator (UTM) coordinates recorded immediately following the conclusion of the survey session. To aid the ECM and ensure consistency throughout the duration of the Project's life, a data sheet will be prepared in advance outlining the required data to be collected. Surveys will be conducted unless wind or rain interferes with audible or visual detection of ravens.

5.4 Breeding Season Raven Surveys

Breeding season surveys will conducted by the ECM biweekly (every two weeks) starting at the beginning of the typical breeding season (mid-February) and continue to the end of June to identify nests and evidence of DT predation at nests (Boarman 2002, 2003). These surveys will be conducted by the ECM, following training by the DB, for the life of the Project on RSPP-controlled lands and along the new transmission line and switchyard. Each survey will consist of systematically searching a Survey Area, which will include the Project site and the aboveground linear features associated with the Project (Figure DR-BIO-55). Because the 5-mile water pipeline is an underground linear component of the RSPP and will not act as a potential raven attractant, it will not be surveyed.

Surveys will be conducted by vehicle when possible and on foot when necessary. All native trees, landscape trees, utility poles, transmission towers, and other structures within the Survey Area will be searched for nests. If nests are identified, the DB will be contacted to verify the nest conditions. UTM coordinates, as well as nesting substrate and current breeding status (if detectable), will be recorded for each nest located. Once data have been collected, the DB will determine if the nest is unoccupied (i.e., no eggs in the nest or nestlings have fledged), in which case the nest will be removed by the DB or the ECM (see description of nest removal in Section

5.5). The DB will search a 30-meter radius surrounding each nest or perch site for evidence of DT predation. All DTs depredated will be photographed, a UTM coordinate collected, and the length measured (or estimated). In addition, each DT will be marked to avoid duplication of data recording on subsequent surveys. If occupied nests are detected during surveys, the Applicant will notify the Raven Management Workgroup for assistance with control measures.

Descriptions of nesting behavior and DT predation will be semi-quantitative and qualitative and will produce data that is valuable for assessing raven behavior and documenting potential problem individuals for management actions. In addition, an increase in the number of raven nests in the Project Area may suggest the potential need for revisions to PDFs or additional control measures (as described in Section 6.0).

5.5 Nest Removal

The majority of raven predation on DT most likely occurs in the spring, from April to May, when DT are most active and ravens are feeding young (Boarman and Heinrich 1999). The removal of unoccupied raven nests will be utilized to control DT predation. Nests will be removed by the DB only from within the Applicant-controlled lands and the transmission line and switchyard ROW. If nests are observed on adjacent lands, the resource agencies will be notified. The removal of unoccupied nests will occur simultaneously with the breeding season raven surveys that will take place from mid-February to the end of June. Removing raven nests outside of the breeding season may have a smaller effect on the raven population since they may readily rebuild the following season. However, evidence suggests that birds with no nests in their territory at the beginning of the breeding season are less likely to commence nesting than those who already have intact nests (Kristan and Boarman 2003). If an unoccupied raven nest is detected outside of the breeding window during biweekly surveys, it will also be removed by the DB.

5.6 Decommissioning and Restoration Phase

To identify potential increases in raven activity, the ECM will conduct at least weekly reconnaissance level surveys in the Project Area during ground disturbance activities associated with decommissioning and grading associated with restoration, if any. Surveys will focus on all potential subsidies including waste disposal areas, erected structures, staging areas where large equipment or material may be stored, and any area where water is applied to control dust and erosion or areas where there are recent surface disturbances.

Data will be recorded for each raven observed, including activity, categorized as flying, perched, or on the ground (likely scavenging); type of perch (if applicable); and the general location of the bird within the Project Area. In addition, any nesting locations will be recorded and unoccupied nests will be removed (see Section 5.5 for a discussion on nest removal). Data sheets will be developed and submitted to the agencies prior to implementation of this Plan, after final Project design is complete.

6.0 ADAPTIVE MANAGEMENT

This section defines how adaptive management principles will be applied to this Plan, specifically in reference to PDF and control/mitigation measure implementation. This section defines potential changes to the mitigation and conditions that may trigger them.

6.1 Definition

Adaptive management is typically used in environmental management efforts to facilitate more effective management of resources to achieve desired objectives. Adaptive management can be defined as an iterative and structured optimal decision-making process intended to reduce uncertainty through system monitoring. The decision-making process simultaneously maximizes one or more resource objectives and accrues information needed to improve future management, either actively or passively. Using current knowledge, passive adaptive management involves the use of conceptual modeling to guide management actions. The model is adjusted as new knowledge is obtained and management decisions are subsequently modified. Active adaptive management involves testing alternative hypotheses through system manipulation employing management strategies. Thus, passive adaptive management is based on information gained from observational studies, whereas active adaptive management is based on information gained from experimental manipulation (Holling 1978). This Plan will focus on passive adaptive management but may ultimately apply both passive and active adaptive management.

6.2 Adaptive Management Triggers

To facilitate meeting Plan objectives, it may be necessary to make changes to the PDFs or initiate the implementation of additional control measures. Implementation of adaptive management measures (described in Section 6.3) would occur if both of the following conditions are met:

a. The results of annual breeding season raven monitoring and/or Project Area monitoring during the operational phase suggest that current PDFs provide evidence that the number of raven occurrences in the Project Area is increasing, thereby increasing the potential for DT predation.

b. The Applicant has made every attempt to adjust PDFs to control raven occurrences and avoid the need for additional control measures, and has contacted and worked with the DB and the resource agencies to identify other sources of ravens and/or management measures, but increased raven occurrences continue.

6.3 Adaptive Management Measures

Adaptive management measures will be identified during implementation of the monitoring program and will be discussed by the Applicant, CEC, USFWS, BLM and the CDFG before any decisions are made. Adaptive management measures may include modifications to PDFs, monitoring strategies, or implementation of additional control measures. Key examples would

be 1) modifications to the monitoring program survey frequency, including increase or reduction of the monitoring frequency and survey points, should results of surveys deem it to be warranted; 2) eliminating or refining a PDF or management measure if it is not working; or 3) incorporating a defined control measure, if impacts are observed, that would not otherwise be implemented (triggered). Potential control measures are discussed in more detail below.

6.4 Control Practices

If the results of the monitoring efforts suggest that there is a substantial and sustained (e.g., consecutive years) increase in raven activity that may result in DT predation, even with the implementation of PDFs as defined in Section 4.0, then the Applicant may need to implement additional measures to further control ravens in the Project Area. This section defines the types of control practices that may be implemented if additional measures are determined to be necessary based on the adaptive management triggers described above.

As stated above, prior to the implementation of any control measure, the DB and the Applicant would coordinate the discussion and approval of control measures with the CEC, USFWS, BLM and the CDFG and control measures proposed to be implemented must be agreed to by these resource agency representatives and the Applicant. If no identified control measures accomplish appropriate raven management objectives, additional control measures will be reassessed for potential implementation.

<u>Roadkill Removal</u>

Ravens are well known for eating animals that have been killed along roads and highways, which are often abundant in the desert region (Boarman and Heinrich 1999). Roadkill provides a food source for ravens, which facilitates increased raven nesting near roads and highways in areas that might otherwise offer little food (Kristan et al. 2004). Due to the unlikely presence of roadkill in the Project Area, roadkill removal is considered unlikely; however, the ECM will document the occurrence of roadkill during the biweekly raven monitoring events. Operations staff will also report roadkill on a daily basis if found. Monitoring of roadkill will focus on the Project Site, with associated paved and dirt roads, and the staging area, but also including any other Project Area facilities that may support vehicular traffic, including construction equipment. If roadkill occurs frequently in the Project Area, and if ravens are commonly noted feeding on roadkill, it may be appropriate for the Applicant to implement a roadkill removal program. Details of a roadkill removal program would be designed by the ECM in coordination with the DB and CEC.

<u>Hazing</u>

Hazing may use any number of visual and/or auditory devices designed to scare birds, including air or gas cannons, human flushing, bioaccoustic deterrents, and/or flags and streamers to create an integrated system of negative stimuli. Because many birds will become accustomed to methods quickly, many of these techniques are used in combination. If deemed appropriate, a hazing program would be designed by the DB in coordination with the ECM and CEC. Permission may also be required from the local police or municipality, as there may be local ordinances that prohibit the creation of loud noises.

Methyl Anthranilate

Methyl anthranilate (MA) is a naturally occurring GRAS- (generally recognized as safe) listed compound used as a food flavoring and fragrance additive. Chemical formulations containing MA have been found to be effective bird aversion agents as MA acts as chemosensory repellent, irritating pain receptors associated with taste and smell (Umeda and Sullivan 2001). When applied as a formulated spray, MA has been found to be effective in repelling birds from feeding on crops such as cherries, blueberries, and table grapes. In addition, MA is used as a repellent for Canadian geese on lawns and in small pools of water. To date, MA is thought to have limitations for topical application as it is considered highly volatile and breaks down readily under exposure to ultraviolet light. The most appropriate application of MA on the RSPP would be to small areas of ponding water or perhaps where known nesting has previously occurred. Repeat topical application would be necessary due to the breakdown of the chemical with exposure but may still prove useful as a short-term deterrent. After removing a current season unoccupied nest, the ECM could apply MA to deter nest rebuilding in that location. Prior to the use of MA at the RSPP, research into the most current application of MA to deter raven activity should be conducted by the DB and methods could be designed in coordination with the ECM and CEC.

Lethal Removal (Depredation)

If ravens are still attracted to the RSPP even after the implementation of PDFs, modification to PDFs, and implementation of control measures, it may be necessary to consider lethal removal. There is no evidence that lethal removal will have a long-lasting effect on raven population levels, raven foraging behavior, or survival of juvenile DT. In addition, identifying, targeting, and successfully removing individuals is also considered time consuming. However, this method is often used in management plans when specific raven pairs are determined to be responsible for taking relatively large numbers of DT (Boarman 2002). These individuals can often be identified by the presence of juvenile DT shells beneath their nests, which are often used for consecutive years by the same pair of breeding ravens (Boarman and Heinrich 1999). By removing those birds known to prey on DT, survival of juvenile DT in that vicinity may increase. However, it is very difficult to identify the target bird(s) with absolute certainty, much less locate and lethally remove both members of a pair.

Under this control method, targeted ravens would be shot by rifle or shotgun. If shooting is not possible (e.g., on power lines) or has been unsuccessful, ravens could be trapped and humanely euthanized. Young ravens found in nests of removed adults need to be euthanized humanely if they can be captured safely.

7.0 REPORTING

The ECM will prepare monthly monitoring reports during construction and the first year of operation summarizing the results of the biweekly and breeding season monitoring events as well as observations reported by operations staff and describing any noted raven activity in the Project Area. Following the first year of operation, a summary of monitoring data will be provided

monthly and a report will be submitted annually. These reports will summarize the survey results, discuss the success or failure of PDFs, and make recommendations for modification of PDFs or implementation of control measures as necessary. These monitoring reports will be submitted to the Applicant and the DB for review. The Applicant will forward the reports to the CEC, USFWS, BLM and CDFG.

8.0 REFERENCES

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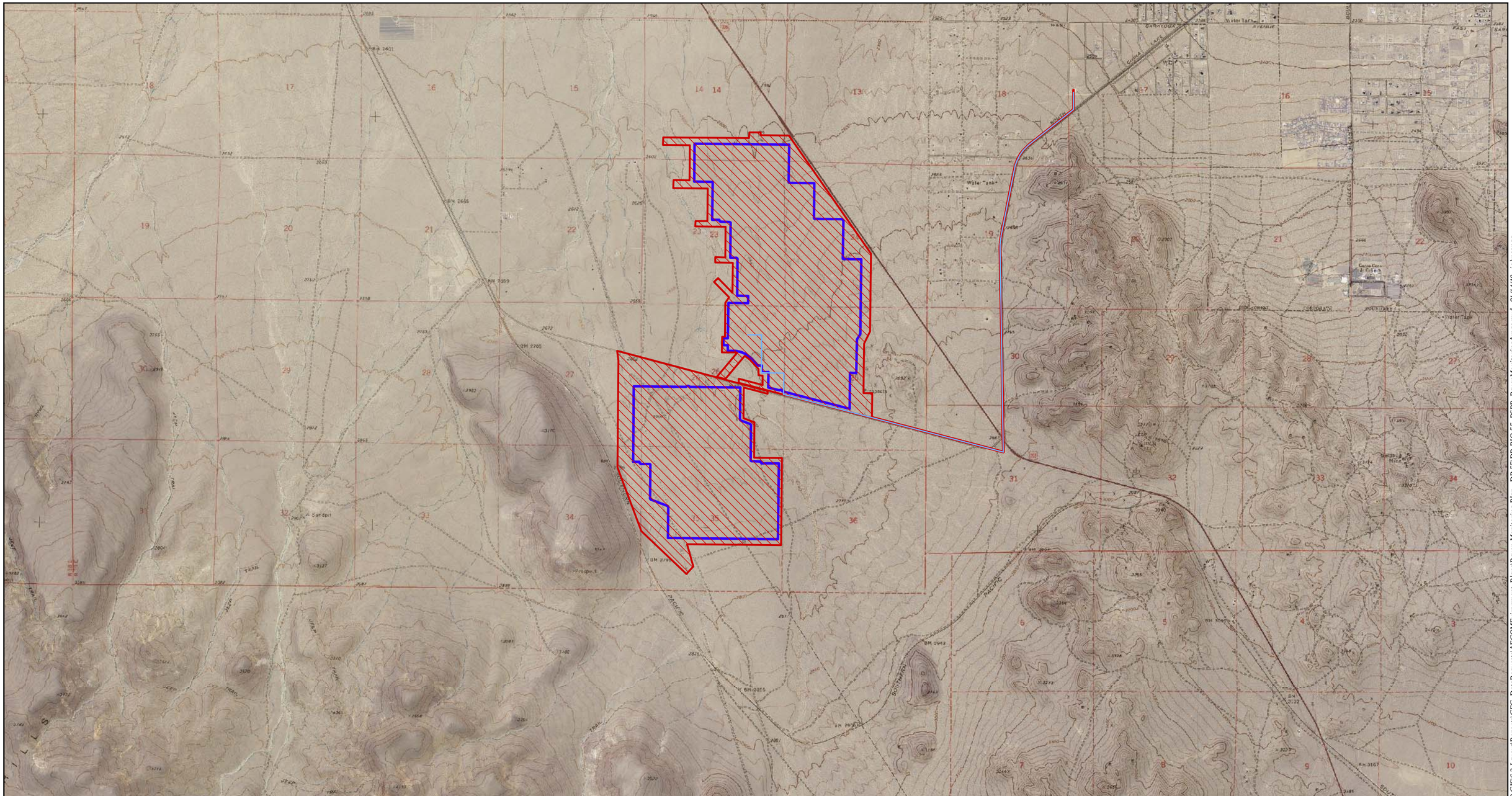

Map Location

Legend

- Plant Site/Annual Biweekly Monitoring Area
- Breeding Season Survey Area
- Water Line

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
Responses to 12/22/09
Data Request

Figure DR-BIO-55
Site Location and
Raven Monitoring Areas

Solar Millennium

AECOM

Date: January 2010

Path: P:\2009\09\80080 Sol Mil Ridgecrest\6.0 GIS\6.3 Layout\Reports\CEC_DataRequests\AECOMEvironment_Plans\Raven Monitoring Plan - DR 55\DR-BIO-55_RSPP_RavenMonitoringAreas.mxd, 01/14/10, johnsonaa

Attachment DR-Bio-56

Draft Burrowing Owl Relocation/Translocation Plan

RIDGECREST SOLAR POWER PROJECT
DRAFT
BURROWING OWL
RELOCATION/TRANSLOCATION PLAN

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DR-BIO-56-2 Vegetation Communities
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I. INTRODUCTION

Ridgecrest Solar I, LLC (hereafter referred to as the Applicant), proposes to construct, own, and operate the Ridgecrest Solar Power Project (RSPP or Project). The Project would have a nominal output of 250 megawatts (MW) and consist of a single power plant utilizing two solar fields.

The RSPP site (Project site) is located in the high northern Mojave Desert in northeastern Kern County, California, about five miles southwest of the City of Ridgecrest, California (Figure DR-BIO-56-1). The Project right-of-way (ROW), for which the Applicant has applied to the Bureau of Land Management (BLM), includes approximately 3,995 acres of public lands owned by the Federal government. The total disturbance area is estimated at 1,944 acres plus an additional 16.3 acres resulting from construction of the water pipeline off site.

Phase I, II, and III protocol surveys for western burrowing owl (*Athene cunicularia*) (WBO), a California Department of Fish and Game (CDFG) Species of Special Concern, were conducted from February 14 through June 15, 2009. A minimum of five WBO were detected in the Project disturbance area (including at least one nesting pair with juveniles) and a minimum of three individuals (including one nesting pair and at least one juvenile) were found in the survey buffer area. WBO sign (droppings, feathers, prey remains, or pellets) was also observed in association with 78 burrows.

To reduce impacts on sensitive biological resources, the Project site plan was reconfigured to minimize impacts to the El Paso Wash. The Project description, including acreage calculations, presented below are based on the reconfigured site plan. However, survey results presented in this report are based on survey conducted in 2009, prior to site redesign. Additional biological surveys will be conducted after the site plan has been finalized in spring 2010 to ensure that all sensitive biological resources in the reconfigured Project footprint have been accurately identified and quantified. Following completion of spring 2010 surveys, impacts to sensitive biological resources will be updated and environmental compliance documents will be revised as appropriate. The Project mitigation will be developed based on the revised impact calculations.

II. BACKGROUND

A. Project Description

The proposed Project site is entirely on Federal land, BLM ROW # CACA 49016, in Township 28 South, Range 39 East and Township 27 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 the BLM. The Project site is composed of undeveloped desert with naturally vegetated areas. There are no existing structures that would need to be demolished, but existing 115 and 220-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. This disturbance area 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-MW solar energy facility on approximately 1,448 acres (Plant Site). 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. A heat transfer fluid (HTF) is heated to high temperatures (750 degrees Fahrenheit) 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 is approximately 894 acres and the south field is approximately 554 acres. The northern solar field is located north of Brown Road and the southern solar field is located south of Brown Road.

The power block is located north of Brown Road, immediately southwest of the northern solar field. The power block is 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 includes a main office building and parking lot, a main warehouse with laydown area, on-site access roads, a tie-in switchyard, and a land treatment unit for bioremediation or land farming of HTF-contaminated soil.

The Project will generate electric power solely via solar energy. Propane will be used to fire an auxiliary boiler overnight to support startup operations until the HTF system is up to operating temperature, at which time the generation of electricity can commence. A second fired heater will be used as needed, mostly during the winter, to prevent freezing of the HTF. A new, approximately 5-mile-long water pipeline will 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 could be 12 inches in diameter or smaller depending on the Water District's determination.) A new 230- kV transmission line from the turbine generator to a new nearby switchyard will interconnect with SCE existing 230 kV InyoKern/Kramer Junction transmission line located west of the Project site.

B. 2009 Burrowing Owl Survey Results

Surveys for WBO were conducted by AECOM biologists in the spring of 2009 per the California Burrowing Owl Consortium (CBOC 1993) protocol and were focused on determining the presence or absence, distribution, abundance, and breeding status of the species. Surveys were conducted within the Project disturbance area and the 492-foot (150-meter [m]) CBOC protocol buffer. Two additional California Energy Commission- (CEC-) recommended transects within a 1-mile buffer were also conducted. Transects located at ¾-mile and 1-mile intervals from and parallel to the disturbance boundary were surveyed. The limits of the survey extend to this 1-mile CEC buffer. The surveys discussed in this document were performed prior to changes to the proposed disturbance area. The site plan has undergone several revisions. Surveys presented in this document included areas that were eliminated from subsequent site plans. Information collected on WBO was included in the biological resources analysis in the Project Application for Certification (AFC), which quantifies potential impacts on WBO and identifies avoidance, minimization, and mitigation measures.

Suitable WBO nesting habitat occurs throughout the Project disturbance area with the exception of a volcanic outcrop along the western edge, granite rock outcrops in the central-eastern portion of the site, and developed areas. The Project disturbance area and 492-foot buffer is dominated by Mojave creosote bush scrub but also includes Mojave Desert wash scrub, unvegetated ephemeral dry washes, and developed land (Figure DR-BIO-56-2). Vegetation within the Mojave creosote bush scrub is dominated by creosote bush (*Larrea tridentata*), burroweed (*Ambrosia dumosa*), cheesebush (*Hymenoclea sa*lsola), and Virgin River brittlebush (*Encelia virginensis*). Common herbaceous species include redstem stork's bill (*Erodium cicutarium*), Mediterranean grass (*Schismus sp*.), needle goldfields (*Lasthenia gracilis*), and blue dicks (*Dichelostemma capitatum*). The dominant and indicator plant of the Mojave Desert wash scrub community is scale-broom (*Lepidospartum squamatum*), which occurs in patches throughout the dry washes scattered amongst creosote bush, spiny senna (*Senna armata*), cheesebush, burroweed, Virgin River brittlebush, 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*). Non-vegetated ephemeral dry washes are dominated by sandy substrate and little to no perennial vegetation. Non-vegetated ephemeral dry wash predominantly occurs between desert wash scrub and locations where the washes transition to sheet flow. There were no dominant perennial plant species observed in association with non-vegetated channels as these areas are primarily devoid of vegetation. Developed areas within the

disturbance area consist of roadways. Brown Road is a two-lane paved roadway that traverses the entire central portion of the Project from east to west. In addition, numerous unpaved dirt roads (approximately 10 miles in total) traverse the Project site. 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 occasionally grow along the center line and are indicative of surrounding vegetation.

Figure DR-BIO-56-3 displays the locations of burrowing owls observed, active burrows (i.e., occupied by burrowing owl), and other locations where sign was observed during surveys. During Phase II and Phase III of the CBOC protocol surveys, seven active burrows were located in three separate regions of the survey area, including five main or nest burrows and two satellite burrows; all of these except one main burrow are located in the Project disturbance area. A minimum of five WBO were detected in the Project disturbance area (including at least one nesting pair with juveniles) and a minimum of three individuals (including one nesting pair and at least one juvenile) were found in the survey buffer area. The following summarizes the burrowing owl occupancy and abundance documented for these three locales within the survey area.

1. At the eastern edge of the Project disturbance area north of Brown Road, three main or nest burrows were located within 500 feet of each other (burrows A, B, and C on Figure DR-BIO-56-3). A pair of owls was observed at each of burrows A, B, and C; fledged juveniles were also observed at burrow B. However, the total number of pairs in this area is uncertain because pairs were never observed at these burrows simultaneously. At burrow A, one adult owl was observed first on April 29, 2009, and regularly throughout the remaining survey period, and a pair was observed there on June 12, 2009. At burrow B, a pair was observed and flushed on June 12, 2009. On June 14, four burrowing owls, including at least two fledglings, flushed from burrow B and flew toward satellite burrows to the west (see Figure DR-BIO-56-3). During this event, at least one adult burrowing owl was observed and remained at burrow A; it did not appear to be associated with the group at burrow B. At burrow C, a pair was flushed on May 23, 2009, during desert tortoise and Phase II burrowing owl surveys. Although owls were not observed at burrow C later during Phase III surveys, abundant burrowing owl sign and a well-maintained burrow entrance indicate concentrated and regular use by owls. It is likely that at least two pairs occupied this area during the survey period, with one pair confirmed to nest successfully and fledge at least two juveniles at burrow B.

2. In the central portion of the Project disturbance area south of Brown Road, one burrowing owl was first documented at burrow D (Figure DR-BIO-56-3) during Phase II surveys on March 24, 2009, and observed again on April 17 and 18, 2009, during Phase III surveys. This location is a burrow complex composed of six burrow entrances. No burrowing owls were found at burrow D during follow-up surveys conducted on April 30, May 12, May 14, May 15, June 12, and June 14, 2009; and, on June 12, 2009, a kit fox family was observed

occupying this complex. The kit foxes appeared to be the same family of two adults and four pups that occupied a burrow complex approximately 500 feet south of burrow D as recently as May 14, 2009. On June 14, 2009, burrow D was inspected to document its condition and search for any burrowing owl sign or remains. The entrances had been excavated by the kit foxes and burrowing owl feathers were observed within and outside one entrance.

3. In the northwest corner of the survey area, a burrowing owl pair and at least one juvenile were located at burrow E, approximately 175 feet outside the previous 492-foot CBOC survey buffer and 675 feet beyond the previous disturbance area; this location is approximately 1,200 feet beyond the current disturbance area. The pair was first observed in this area on June 13, 2009. On June 14, 2009, the nest burrow (burrow E, Figure DR-BIO-56-3) was located and mapped. The female flushed from the burrow while the male was perching on a creosote shrub nearby. Although juvenile burrowing owls were not observed, at least one owl was heard inside the burrow while both adults were away.

III. PLAN PURPOSE

The primary purpose of this Plan is to provide an effective and feasible strategy that would ensure the protection of WBO from the construction and operational impacts of Project development. This Plan also fulfills some of the Project mitigation measures identified in the AFC document (AECOM 2009a), which include requirements for relocation/translocation of WBO. This Plan includes both passive relocation and active translocation. At this time, it is unclear what method would be most effective in terms of minimizing impacts to WBO. The Applicant would prefer to use passive relocation rather than translocation whenever feasible. It is assumed that the decision to relocate or translocate WBO will be determine as part of future consultation with the resource agencies. Once this plan is approved by the CDFG and CEC, the elements described herein would become part of the Project conditions of approval with which compliance is required.

IV. PLAN GOALS

The goals of this Plan are to:

- Provide a relocation/translocation strategy and protect WBO during Project construction.
- Relocate rather than translocate WBO whenever feasible.
- Ensure that WBO within the Project disturbance area are relocated/translocated to a nearby area that provides suitable nesting and foraging habitat.
- If translocation is implemented, minimize impacts to resident WBO and other sensitive species (e.g., desert tortoise) within the translocation site, and minimize stress and injuries to any translocated WBO.

V. WESTERN BURROWING OWL RELOCATION/TRANSLOCATION PLAN

This section discusses management strategies for the relocation or translocation of WBO for the RSPP. A multi-tiered approach is proposed to prevent or reduce the loss of WBO during the construction activities and operation of the Project. While mitigation often focuses on protecting animals *in situ* by making adjustments to construction activities near occupied burrows, moving individuals out of impact areas to off-site locations is sometimes the best alternative. Because WBO are resident within the Project area, it may be necessary to actively move individuals out of the Project disturbance area scheduled for construction. If active WBO burrows are documented outside of the Project disturbance area but within the CBOC buffer area, passive relocation as outlined by the CBOC may be implemented instead of translocation. Passive relocation would include the installation of exclusion fencing to ensure that no disturbance occurs within 160 feet of active burrows during the non-breeding season and within 250 feet of active burrows during the breeding season. The management strategy includes the following elements:

1. Pre-activity surveys,
2. Passive relocation options,
3. Translocation options,
4. Construction monitoring at the Project site, and
5. Post-translocation monitoring.

The multi-tiered approach includes pre-activity surveys to assess the resident population of WBO, options for passively relocating or actively translocating WBO to an approved area prior to construction activities, monitoring to ensure that relocated/translocated WBO have not returned to the Project site during construction activities, and monitoring the translocation site (if applicable) to determine the fate of any translocated birds. If translocation is implemented, WBO would be translocated outside the nesting season and before construction begins, to minimize the likelihood of translocated individuals returning to the site. The following sections describe the proposed relocation/translocation approach, which incorporates measures to minimize the likelihood of WBO returning to the Project site.

A. Pre-Activity Surveys

A pre-activity survey of the Project disturbance area would be conducted during the non-breeding season (December 1 to January 31) prior to construction to locate and identify active WBO burrows, estimate the current number of WBO individuals or pairs on site, and attempt to determine if they are breeding pairs or migrating transient birds. The survey would consist of walking parallel transects to allow for 100 percent coverage of the site and noting any fresh WBO sign or presence of WBO. Pre-activity surveys would be conducted throughout the Project disturbance area and within the 492-foot-buffer surrounding the Project disturbance area. The results of the pre-activity survey and recommended protection measures based on the location of any identified WBO would be provided to CDFG. Pre-activity surveys would be conducted no

more than 30 days prior to construction with a follow-up pre-construction survey conducted within three to five days of construction initiation.

At all times, surveyors will maintain a minimum distance of approximately 10 feet from known occupied burrows or observed WBO to minimize disturbance. If WBO are present within 500 feet of the Project site or linear facilities during the pre-construction surveys, CDFG WBO mitigation guidelines will be implemented.

If, during preconstruction surveys, WBO activity is detected at a burrow, every attempt would be made to avoid disturbance to the burrow by modifying either the placement or the timing of work activity. During the breeding season (February 1 through August 31), a 250-foot buffer will be flagged surrounding the occupied burrow per CBOC guidelines and all work activity will 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 non-breeding season (September 1 to January 31), a 160-foot buffer will be maintained per CBOC guidelines. If construction activity cannot be moved or rescheduled, 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.

All unoccupied but potentially suitable WBO burrows located on site during the initial surveys and still present during the 30-day pre-activity survey would be carefully excavated and filled under the supervision of a qualified biologist prior to site grading, to ensure that WBO are not occupying on-site burrows within the disturbance area during construction.

B. Passive Relocation Strategy

Several factors would determine whether passive relocation would be implemented, including the number of WBO found within the Project disturbance area during pre-construction surveys and the availability of suitable burrows outside the Project disturbance area. Passive relocation would be a favorable option if very few WBO are detected and if WBO are only found in buffer areas. The decision to proceed with passive relocation or translocation (discussed below) would be made in consultation with CDFG and the CEC.

After pre-activity surveys determine how WBO currently use the Project site, WBO would be passively excluded from entering burrows within the construction footprint and a surrounding 160-foot buffer zone by installing exclusionary one-way doors. If relocation would occur near the breeding season, focused monitoring of the WBO would be conducted to ensure nesting is not underway or to determine if nesting has been concluded prior to relocation efforts. Burrows will be excavated after determined vacant by use of a down-hole camera, monitoring, and use of one-way doors.

Excluded burrows would be monitored daily for one week to confirm no additional owl use before excavating the burrows. After burrows are confirmed to no longer be in use, the burrow would be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe or burlap bag would be inserted into the tunnels during excavation to maintain an escape route for any WBO inside the burrow.

Prior to passive exclusion efforts, WBO to be displaced may be captured and color banded to later evaluate the success of the passive relocation.

C. Translocation Strategy

There is no agency-approved protocol for translocating WBO in California; however, the following translocation procedures have been developed in consultation with Mr. Peter Bloom. Mr. Bloom is a zoologist who specializes in birds of prey, is permitted to trap and relocate WBO in California, and is a member of the Project team (DR-BIO-56-B). If translocation is implemented, prior to any translocation activities, permission would be obtained from CDFG to relocate WBO from the site. Translocation involves the capturing of individual WBO and moving them to a location away from the Project site with suitable habitat for the species. WBO would be removed by Mr. Bloom during the months of December, January, and February, prior to the beginning of the core nesting season. The translocation procedures would involve translocation site selection, site management and preparation, pre-construction surveys, trapping, care of WBO while captured, monitoring of release sites, and post-release monitoring. These elements are described below.

Translocation Site Selection

The identification of potential translocation sites is currently in progress, concurrent with identification of potential acquisition lands for overall compensatory mitigation of Project impacts. The CBOC recommends that, to mitigate for unavoidable impacts to WBO, 6.5 acres of habitat per pair or occupied burrow should be set aside to provide suitable foraging and nesting habitat. The translocation sites must meet the CBOC minimum size requirements and either occur in suitable habitat similar to habitat at the RSPP site or along the edge of an existing alfalfa field that could be managed for WBO (personal communication, Peter Bloom 2009). Translocation sites could be just outside the Project disturbance area or can include areas that are farther away from the Project site. However, priority lands for WBO translocation would be close to the RSPP, contain an abundance of available suitable burrows, and provide suitable nesting and foraging habitat with year-round prey availability (i.e., small mammals, songbirds, lizards and insects). Sites with existing or likely future conservation status (e.g., lands acquired specifically to mitigate for Project impacts) would also be considered priority sites. Importantly, the area selected must be an area protected in perpetuity and at least partly managed specifically for WBO.

More than 6.5 acres of land per pair may be required for managing WBO either long term or short term. Radio telemetry studies during the nesting season have revealed males foraging out as much as 1.6 km (1 mile) from the nest and regularly using an area within 600 m (1,968 feet) of the nest at night (personal communication, Peter Bloom 2009). When identifying lands for mitigation, this will be a necessary consideration in terms of the long-term habitat needs of WBO and to ensure that acquired land can support WBO pairs.

Once an appropriate translocation area has been identified, CBOC Phase II (burrow mapping) and III (presence/absence) surveys for WBO will be conducted to characterize the existing or potential use of the translocation site by WBO and to determine habitat management potential.

If the selected translocation site does not contain an adequate number of suitable natural burrows as determined in consultation with the CDFG and CEC, artificial burrows for nesting and escape burrows will be installed. Prior to ground disturbance at the translocation site, surveys for other sensitive species (e.g., desert tortoise, sensitive plants) may be required to ensure that the construction of artificial burrows at the release site will not adversely impact those species.

Translocation Site Management

Private lands acquired for WBO translocation would be managed over the long term for WBO viability and habitat suitability per a site-specific management plan to be approved by the CDFG. An appropriate monetary endowment for translocation site management will also be secured to ensure the management plan components are implemented. A property title transfer to CDFG may also be required where private lands are acquired for translocation purposes.

Completion of a public land lease per BLM realty provisions and/or development of a Memorandum of Understanding with a local BLM field office would be necessary to utilize public lands managed by BLM for translocation. Public land status under the recently adopted Land Tenure Adjustment Plan (BLM 2005), i.e., lands identified for retention or disposal, as well as their Multiple Use Classification (Limited, Moderate or Unclassified), would be primary considerations in such an endeavor. Approval by BLM's California State Office is also required for any public land wildlife translocation.

Site-specific National Environmental Policy Act documentation likely would be required for any translocation action involving federal public lands. The BLM's multiple-use mandate would be applicable and potential translocation site management needs would need to be considered and implemented in a manner consistent with that mandate.

Translocation Site Preparation

Once the translocation site has been identified, release enclosures and additional artificial burrows would be constructed for each WBO individual or pair identified for translocation. The release enclosure would include an approximately 12-foot by 12-foot by 6-foot cage surrounding

1-2 artificial burrows. Artificial burrows would be designed to maximize their suitability and effectiveness. If improperly designed, an artificial burrow may attract predators, fill with rainwater, dirt, or debris, or fail to provide adequate cover. Four additional artificial burrows per released pair would also be installed, each at varying distances outside each release enclosure, to provide refugia (i.e., escape burrows) and potential nest burrows. The additional artificial burrows would provide potential escape cover and help reduce mortality as the fledglings venture from the enclosure. These artificial burrows could also provide additional nest sites for WBO native to the translocation area including burrows for dispersing young and adults, and temporary burrows for winter migrants. Figure DR-BIO-56-4 depicts an example of a design layout for the construction of an artificial burrow.

Translocation Protocol

If translocation is implemented, WBO individuals and/or pairs identified for translocation would be trapped immediately prior to the breeding season and placed into their enclosures at the translocation site as a pair. The enclosures prevent the pair from immediately returning to the Project site. Ideally, the WBO pairs would breed, lay eggs, and successfully rear young in the enclosure and artificial burrows; thus increasing site fidelity of both adults and young at the translocation site once the enclosure is removed and reducing the risk of the WBO returning to the Project site. The translocation protocol consists of the following steps:

- WBO would be captured using a combination of noose carpets, mist nets, or bow-nets (Bloom et al. 2007).
- Once the WBO pairs are captured, they would be banded with unique color bands and immediately driven to the release site and deposited in their respective enclosures.
- Any remaining burrows within the Project disturbance area would be monitored and subsequently excavated and collapsed as described in the passive relocation protocol.
- WBO would be moved to and maintained at the release site inside enclosures until mid-April through approximately mid-May when eggs should have been laid. If eggs or young are not present by these dates, a decision will be made based in part upon project progress and owl breeding biology. Specifically, if construction disturbance at the project is complete, the owls may be released even without eggs or young. Between mid-April and mid-May the adults will either return to the project site and find no nesting opportunities or, more likely, establish their own natural burrow or artificial burrow on the new site. They may also select a nest burrow nearby their place of origin. This level of attention would require active monitoring by a qualified biologist and may require the use of a down-hole camera.
- Permitted raptor biologists would provide feedings of dead or live house mice (*Mus musculus*) at a rate of two mice per WBO per day during the holding period.

- During the holding period, the qualified biologist would continually evaluate and address problems from trespassers and possible predators (e.g., coyotes, feral dogs, raptors) at the release site. Appropriate management actions would be established prior to Project implementation and would be followed if any actions are required. Any actions taken will be included in the annual and interim report.

- The enclosure would be removed in April or May, or when it has been determined that the pair have successfully produced a clutch of eggs, or it is recognized that the best opportunity for the particular pair to lay eggs is higher if the pair is released sooner.

- In addition to banding the translocated adult pairs, fledglings would also be uniquely banded in order to monitor their behavior, survival, and movements.

Post-Release Monitoring

Monthly monitoring would be initiated once birds have been released from the enclosures. Monitoring would involve searches for banded translocated adults and include burrow maintenance at the translocation area. The monitoring process is outlined below.

- Only qualified raptor biologists familiar with methods and techniques necessary to reduce owl harassment and experienced in reading color bands with proper equipment would conduct monthly monitoring.

- The sites would be monitored for two years post release unless the birds are known to have died. One visit would be made each month for a total of 24 visits.

- Searches would be conducted with binoculars, spotting scopes, and down-hole cameras using techniques that would reduce owl harassment.

- Monitoring would also include remote cameras placed around burrow complexes to help provide re-sight data.

- If released owls disappear from the release site, monitoring of the Project area and adjacent lands would immediately commence to determine if the adult WBO returned to the Project site.

- Post-release monitoring would also include maintenance of artificial burrows three to four times each year as necessary to ensure boxes are usable for the breeding and non-breeding seasons.

D. Reporting

An annual report would be submitted following each breeding season for two years post-translocation. Additional interim reporting on the relocation efforts would be provided via

electronic mail and would include the date trapping efforts begin, the date of burrow excavations, findings, and initiation of activities. Additionally, any owl injuries, mortality, or other unforeseen circumstances would be reported to all resource agencies within 24 hours.

Annual reports would be submitted to the CEC, CDFG, BLM, and U.S. Fish and Wildlife Service. Reports would include, but not be limited to the following data:

- Project name, locations, and all pertinent information pertaining to the origin site.
- Dates and numbers of WBO placed into enclosures including band numbers and color bands.
- Information gained while WBO are in the release enclosure: feeding schedules, nest status, eggs laid, eggs hatched, chicks fledged.
- Known predators or humans visiting or disturbing the site.
- Dates of release from enclosures.
- Monthly monitoring results (re-sights of color banded birds, use of artificial burrows versus natural burrows by released adults and young).
- Any other pertinent data gathered through the relocation, release and post release monitoring.

VI. CONTINGENCY PLANNING AND PROGRAM CONTACTS

To address any unforeseen circumstances, the Applicant is committed to implementing an adaptive management program that functions within the constraints of the Project permits and approvals. Adaptive management decisions will be made with the input from pertinent regulatory agency staff in a timely manner so that mid-course corrections can be made to ensure the protection of WBO.

In the event that unforeseen circumstances arise relative to this Relocation/Translocation Program, or any CEC Condition of Certification, the CEC's Compliance Project Manager for this Project, the CEC's Project Manager, or the CEC's Siting Office Manager will be notified by the Relocation/Translocation Program's Designated Biologist to resolve the issue or determine a corrective course of action.

Peter Bloom, zoologist and Project team member, will be consulted on an ongoing basis on the technical aspects and review of relocation/translocation data monitoring and reporting.

VII. **REFERENCES**

AECOM

2009a Ridgecrest Solar Power Project Application for Certification. Prepared for Ridgecrest Solar I, LLC. August.

2009b Ridgecrest Solar Power Project Western Burrowing Owl Technical Report. Prepared for Ridgecrest Solar I, LLC. September.

Bloom, Peter.

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Bloom, P.H., W.S. Clark, and J.W. Kidd.

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1993 Burrowing Owl Survey Protocols and Mitigation Guidelines. Sacramento, California. April.

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Ridgecrest Solar Power Project Responses to 12/22/09 Data Requests

Figure DR-BIO-56-1 Regional Map

Source: ESRI; AECOM 2009

Solar Millennium

AECOM

Date: January 2010

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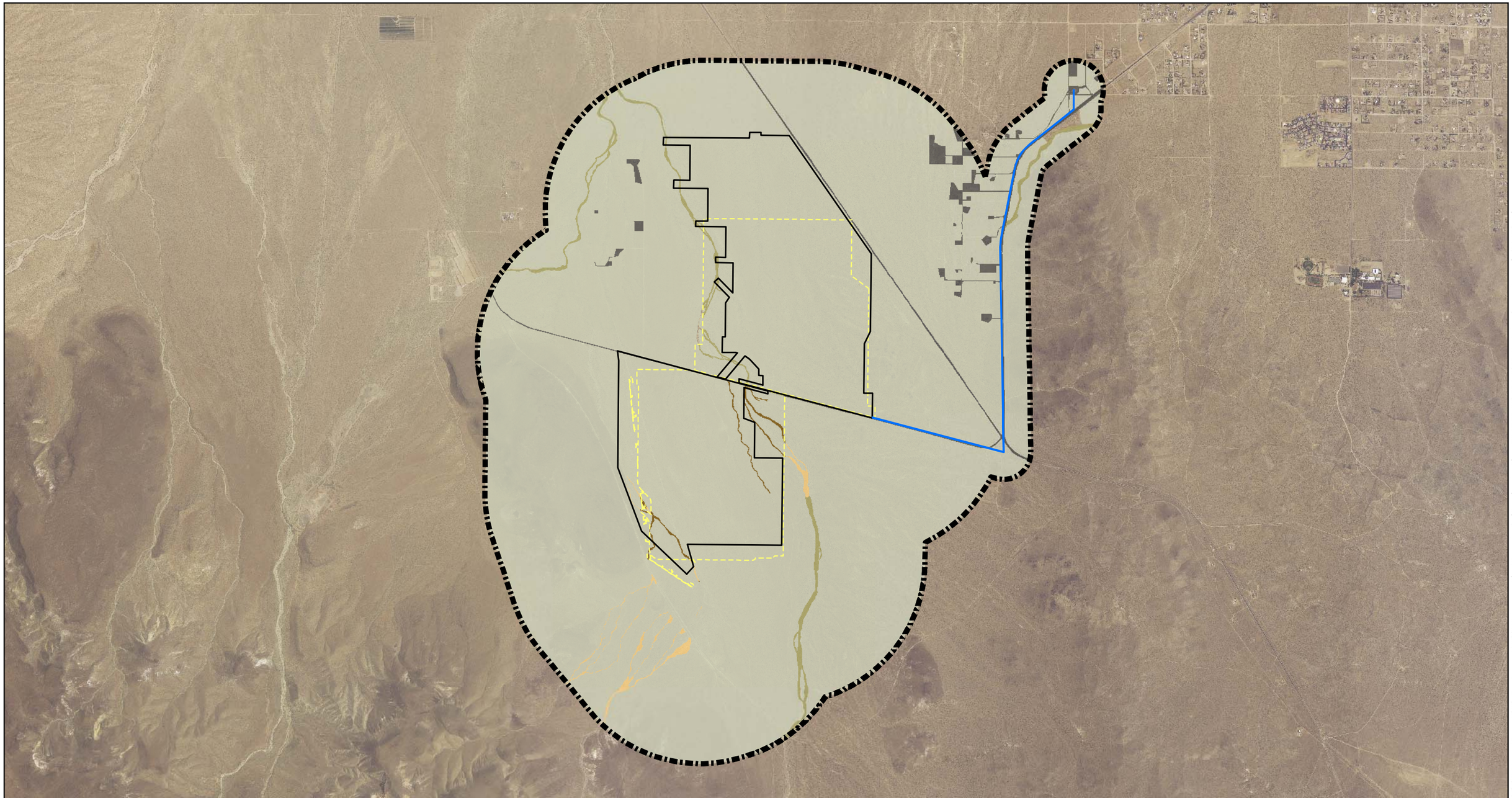

Map Location

Legend

- Surveyed Biological Resources Survey Area (BRSA)
- Surveyed Disturbance Area
- Reconfigured Disturbance Area
- Water Line Disturbance Area

Vegetation Communities

Riparian

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

Upland

- Mojave Creosote Bush Scrub

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
Responses to 12/22/09
Data Request

Figure DR-BIO-56-2
Vegetation Communities

Solar Millennium

AECOM

Date: January 2010

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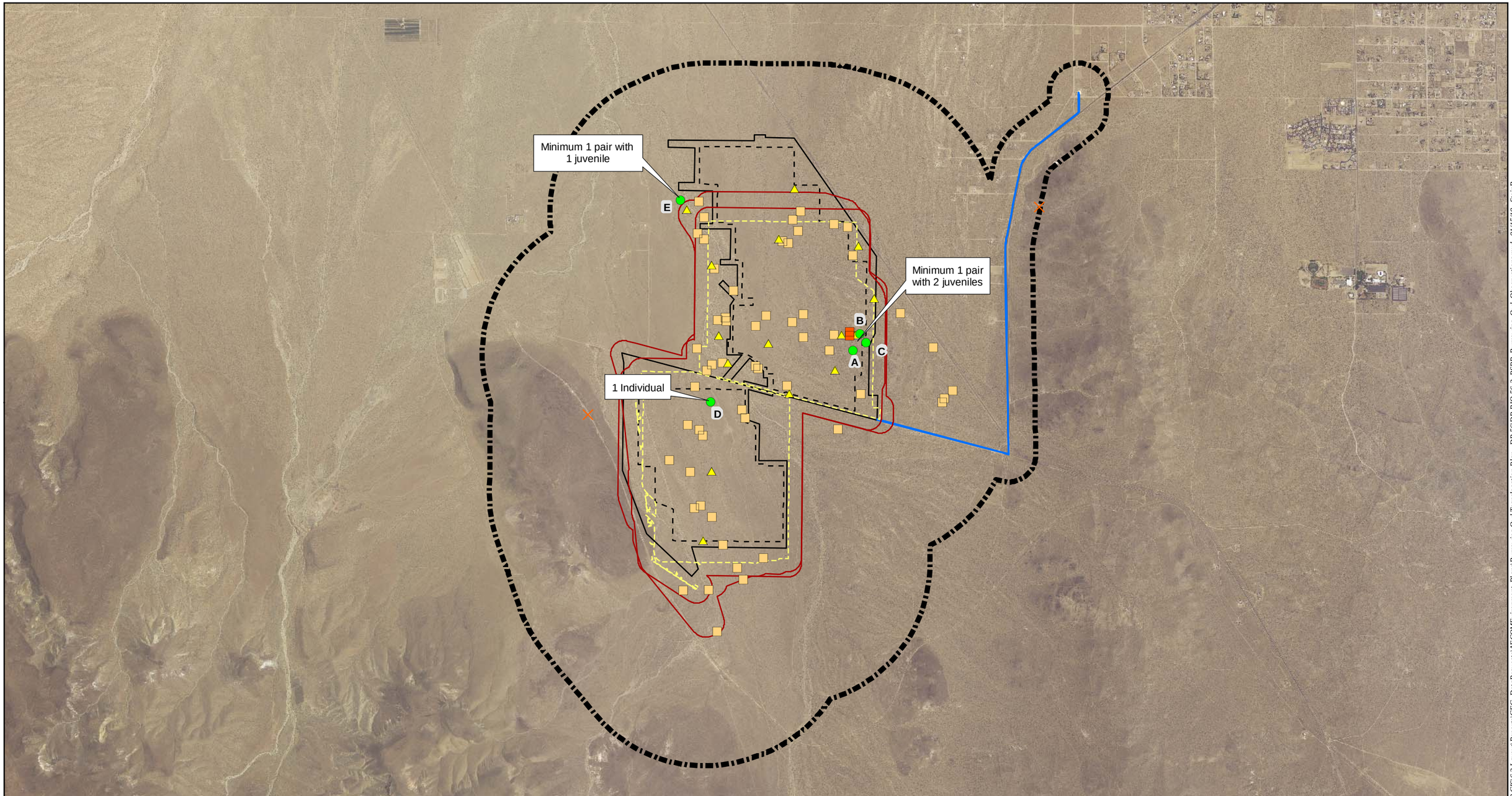

Map Location

Legend

- Biological Resources Survey Area (BRSA)
- Facility Footprint
- Reconfigured Disturbance Area
- Water Line Disturbance Area
- Surveyed Disturbance Area

Burrowing Owl Survey Buffer

- Previous CBOC 492-foot

Burrowing Owl Observations

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

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
Responses to 12/22/09
Data Request

Figure DR-BIO-56-3
Burrowing Owl Observations

Solar Millennium

AECOM

Date: January 2010

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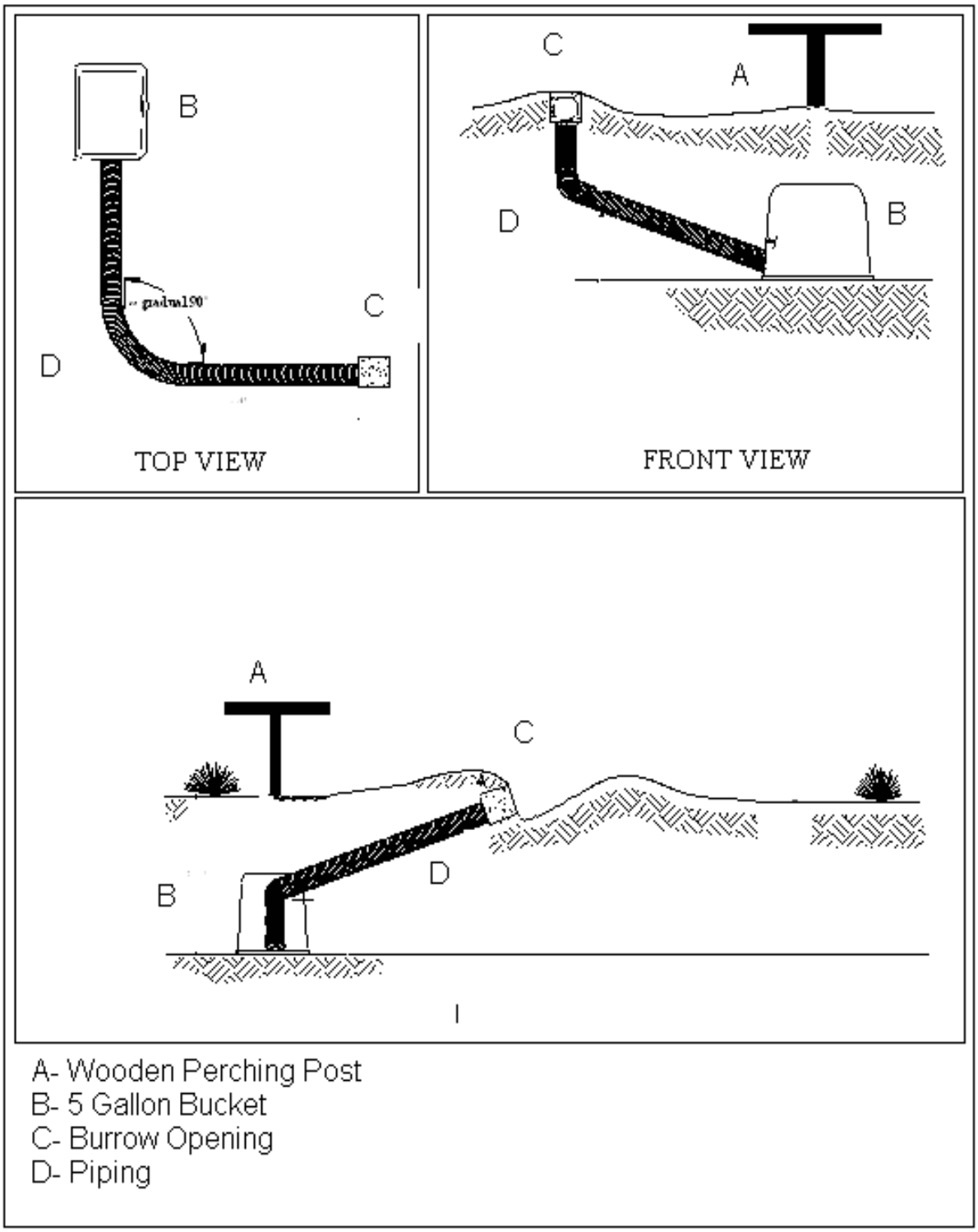
DR-BIO-56-4 Example of a design layout for the construction of an artificial burrow.



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EDUCATION:

8/01-Present PhD candidate, College of Natural Resources, University of Idaho, Moscow. Dissertation topic: Natal Dispersal and Philopatry in Sympatric Buteos in Southwestern California.

9/79 - 8/89 California State University, Long Beach, M.S. Degree in biology August 1989. Thesis: Red-shouldered Hawk habitat home range and habitat use in southern California.
Graduation with Honors. Outstanding thesis award, School of Natural Sciences.

9/71 - 5/79 California State University, Long Beach, B.S. Degree in zoology, May 1979.

PROFESSIONAL HISTORY:

1/77-present President Bloom Biological Inc. Independent research biologist/consultant. Supervised 1-7 employees/year and/or 50 sub-consultants. Responsible for performing surveys of nesting and wintering birds of prey for the California Department of Fish and Game, Bureau of Land Management, U.S. Forest Service, Department of Defense, and numerous private land owners. Countless general biological surveys. Monitored radio tagged adult California red-legged frogs in Ventura County 4-6 times per month for 6 months. Numerous focused surveys for California gnatcatcher, southwestern willow flycatcher, least Bell's vireo, arroyo southwestern toad, red-legged frog, coast horned lizard, flat-tailed horned lizard, desert tortoise, orange-throated whiptail, coastal whiptail, coast-patched nosed snake, coastal glossy snake, red-diamond rattlesnake, Pacific pond turtle (which included trapping and surveying habitat) , two-striped garter snake (which included trapping and surveying habitat) and Pacific pocket mouse. Numerous general herpetological, small mammal, breeding bird and winter bird surveys in southern California. Translocated several hundred arroyo toads at MCB, Camp Pendleton. Managed sensitive herpetological, mammal and raptor surveys for the Transportation Corridor Agency in Orange County and a raptor status and management plan for Naval Weapons Station, Seal Beach and Fallbrook Detachment. Prepared numerous biological assessments, and worked on several avian research projects in the western U.S., Alaska, Peru, Ecuador, and India. Over 500 hours of helicopter and fixed wing nest survey work and aerial radio tracking of eagles, California condors, hawks and herons. Fiber-optics and electrical powerline installation surveys and construction monitoring.

7/90-present: Research Biologist, Western Foundation of Vertebrate Zoology. Served on Science Advisory Board of the South Orange County Natural Communities Conservation Program and Tejon Ranch. Herpetological input into the Orange County environmental GIS and Cleveland National Forest environmental inventory. Management of long-term (30 yr.) raptor ecology study in California. Management of successful Great Blue Heron mitigation project designed to increase numbers of nesting herons through artificial nest platforms. Supervised and performed predator management activities related to protection of California least terns, snowy plovers, and light-footed clapper rails in southwestern California from avian and other vertebrate predators for FWS. Locations included Vandenberg Air Force Base, Naval Weapons Station, Seal Beach, Batiqutios Lagoon, Port of Long Beach, Port of San Diego, and Tijuana Slough National Wildlife Refuge. Supervised a two year Caltrans radio-telemetry study of nesting peregrine falcons in southwestern California and their relationship to California least terns. Organized and finished 7 years of a MAPS passerine monitoring station.

1/93-2001: Research biologist/advisor in India (7 visits) for Indo-US wildlife conservation project sponsored by the U.S. Fish & Wildlife Service International Affairs Office, Indian Government, and Bombay Natural History Society. Responsibilities involve educating local biologists in the various techniques needed to capture birds, and radio-telemetry research.

1993-present: Professor at Saddleback College, Department of Technology and Applied Sciences. California Natural History.

1990-present: Dept. of Biology, Calif. State Univ., Long Beach, thesis advisor to seven students, C.S.U., Humboldt, one student, and C.S.U., Fullerton, one student.

5/82-6/90 Research Biologist, National Audubon Society. Responsible for writing the grant proposal and ultimately the successful award of two grants totaling $300,000 for 6 years of full time research on the ecology of southern California raptor populations. Responsible for project management, personnel selection, supervision of 12 volunteers, proposal and budget preparation, method design, data analysis, report writing, and publication of results. Directed the effort to capture all wild free flying California condors for transmitter placement or captive breeding. Radio tracked condors, and conducted contaminant studies involving condors and 180 golden eagles.

5/81-9/83 Research biologist, University of California, Santa Cruz. Principal investigator on a three year study designed to determine the status of goshawk populations in California for the Department of Fish and Game.

1/80-8/81 Research biologist. Trapped, and placed transmitters on great gray owls for the U.S. Forest Service, prairie falcons for the Department of Fish and Game, and peregrine falcons in Peru, South America for the Bodega Bay Institute of Pollution Ecology.

4/79-10/79 Wildlife Biologist. U.S.D.I., Bureau of Land Management. Principal investigator of a study designed to determine the status of the Swainson's hawk in California. Surveyed all semi-arid and desert regions, reviewed literature and museum records, assessed reproduction, banded adults and young, and prepared final report. Resulted in listing of the Swainson's hawk.

1/79-6/79 Research biologist. Camp Pendleton Marine Corps Base. Awarded a contract to survey, and report on the ecology, and distribution of raptors inhabiting the 200 sq. mile base.

6/75-10/79 Biological technician. U.S.D.I., Bureau of Land Management. California and Nevada. Conducted reptile, amphibian, small mammal, and avian surveys of 3.25 million acres of public land as part of a grazing EIS.

PERMITS

Federal Endangered Species Permit (TE-787376-8) for Red-legged Frog (transmitters, transponders), Arroyo Southwestern Toad, California Gnatcatcher (banding), Least Bell's Vireo (banding), Southwestern Willow Flycatcher (banding), California Least Tern, Snowy Plover, Peregrine Falcon, Bald Eagle, and Swainson's Hawk. Federal Bird Marking and Salvage Permit. Predator Management Permit. Migratory Bird (Burrowing Owls etc.) relocation permit. Cowbird trapping authorization. Desert Tortoise surveys.

AWARDS:

The Wildlife Society Western Section, 2005 Professional of the Year.
Association of Field Ornithologists 1981 Bergstrom Award.
The Nature Conservancy – 2004 & 2006, $27,000 in Satellite Transmitters.

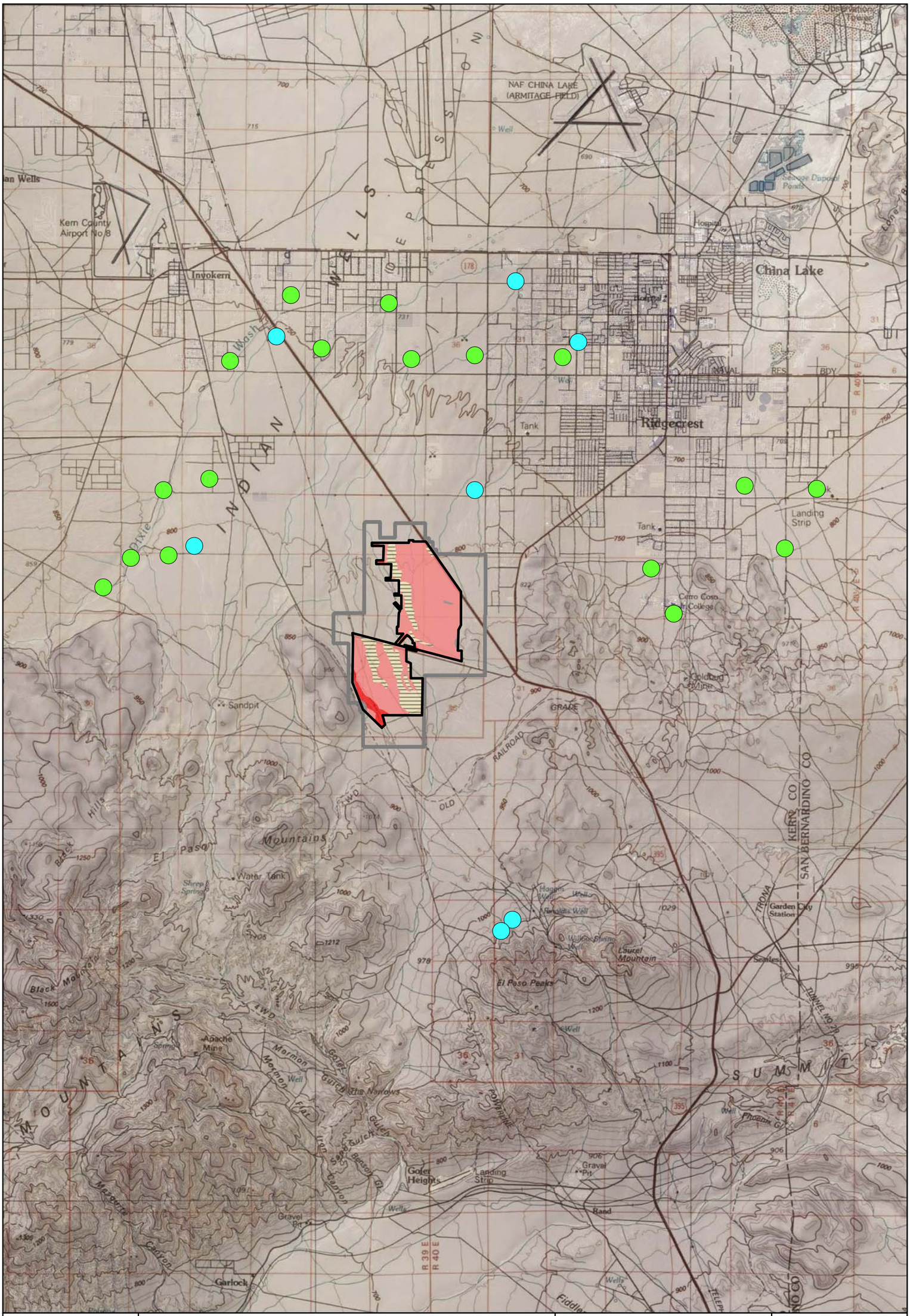
OTHER ACTIVITIES:

PROFESSIONAL MEMBERSHIPS The Western Section - Wildlife Society (Life), The Raptor Research Foundation (Life), American Ornithologists Union, Cooper Ornithological Society (Life), Association of Field Ornithologists (Life), Western Bird Banding Association (Life), Society for Conservation Biology (Life), Society for the Study of Amphibians and Reptiles, Hawk Migration Association (Life), California Native Plant Society (Life).

BOOK REVIEWS The Auk (Johnsgard. 1990 - Hawks, Eagles, and Falcons of North America), Journal of Raptor Research (Wheeler and Clark. 1995 - A photographic guide to North American Raptors), Journal of Raptor Research (Glinski 1998 The Raptors of Arizona).

Attachment DR-BIO-58

Figures



Map Location

Legend

MGS Occurance

- Prior to 1988
- 1988 to Present
- Disturbance Area

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
- ROW

1 inch = 2 miles

0 1.5 3 Miles

Ridgecrest Solar Power Project
Responses to 12/22/09
Data Request

Figure DR-BIO-58-1
Overview Mohave Ground Squirrel
Records within 5 Miles of ROW

Source: USGS; NAIP 2005; CNDDB; Leitner 2009

Solar Millennium

AECOM

Date: January 2010

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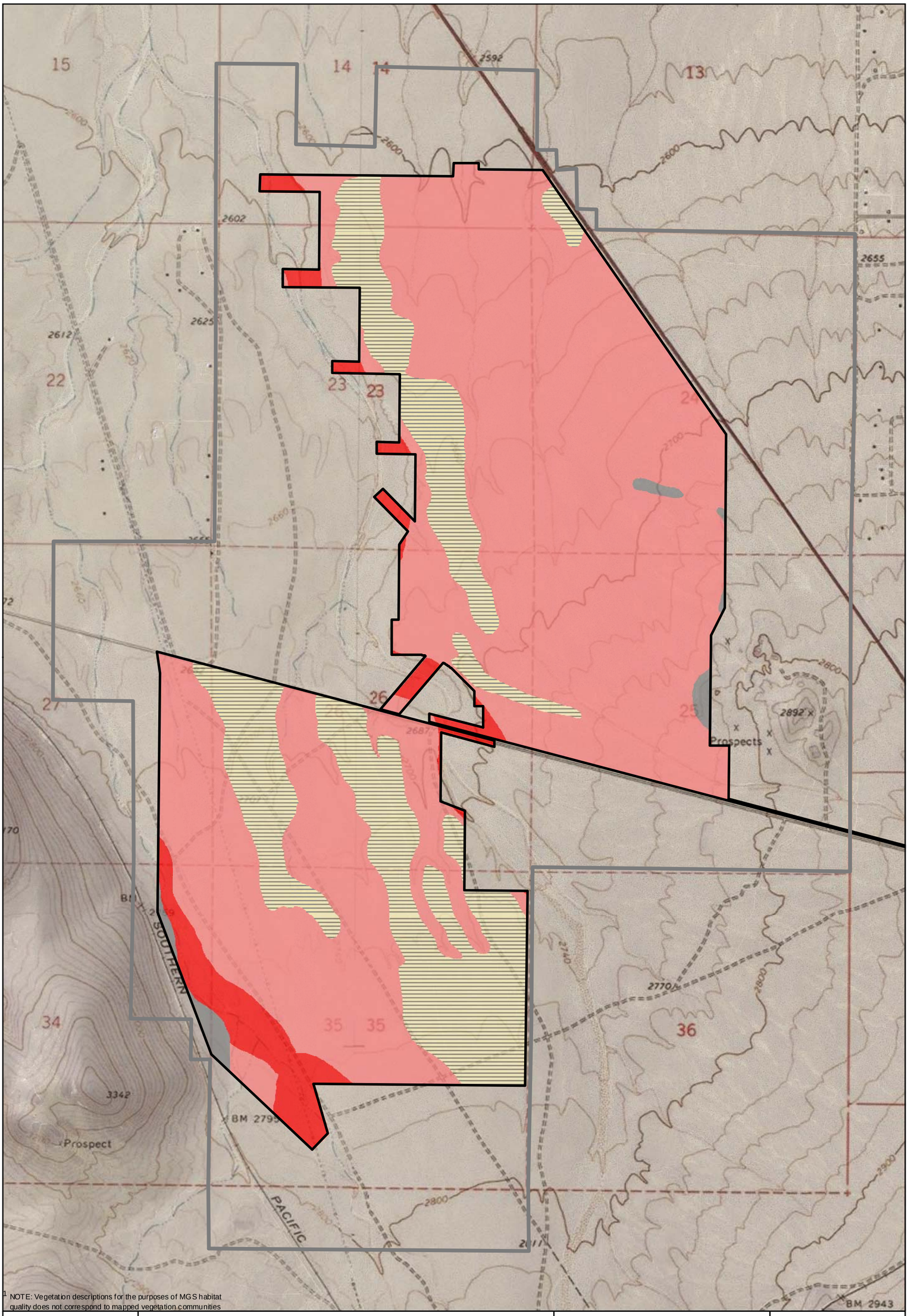


[1] NOTE: Vegetation descriptions for the purposes of MGS habitat quality does not correspond to mapped vegetation communities

Map Location

Legend

ROW

Disturbance Area

Habitat Quality

Mohave Ground Squirrel [1]

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

1 inch = 1,500 feet

0 1,500 3,000 Feet

N W E S

Ridgecrest Solar Power Project
Responses to 12/22/09
Data Request

Figure DR-BIO-58-2
Habitat Quality
Mohave Ground Squirrel

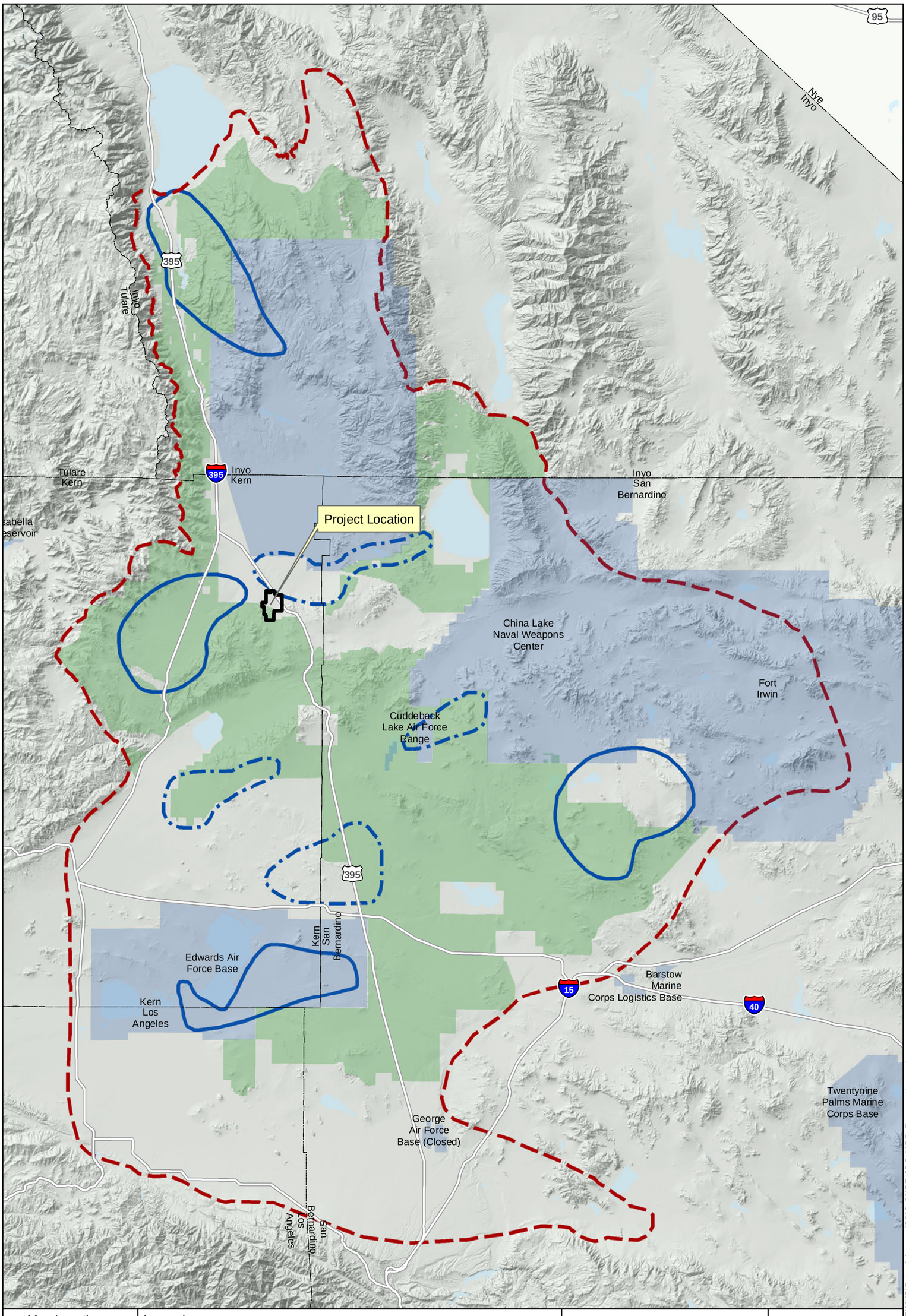
Source: USGS; NAIP 2005; Leitner 2009

Solar Millennium

AECOM

Date: January 2010

Path: P:\2009\09080080_Sol Mil Ridgecrest\6.0 GIS\6.3 Layout Reports\CEC_DataRequests\Wildlife\DR_BIO_58-2_MGS_Habitat.mxd, 01/15/10, SteinB



Map Location

Legend

- Mohave Ground Squirrel Range
- Identified Core Areas
- Other Known Populations
- West Mojave Plan MGS Conservation Area

1 inch = 60,000 feet

0 30,000 60,000 120,000 Feet

Ridgecrest Solar Power Project
Responses to 12/22/09
Data Request

Figure DR-58-3
Mohave Ground Squirrel
Conservation

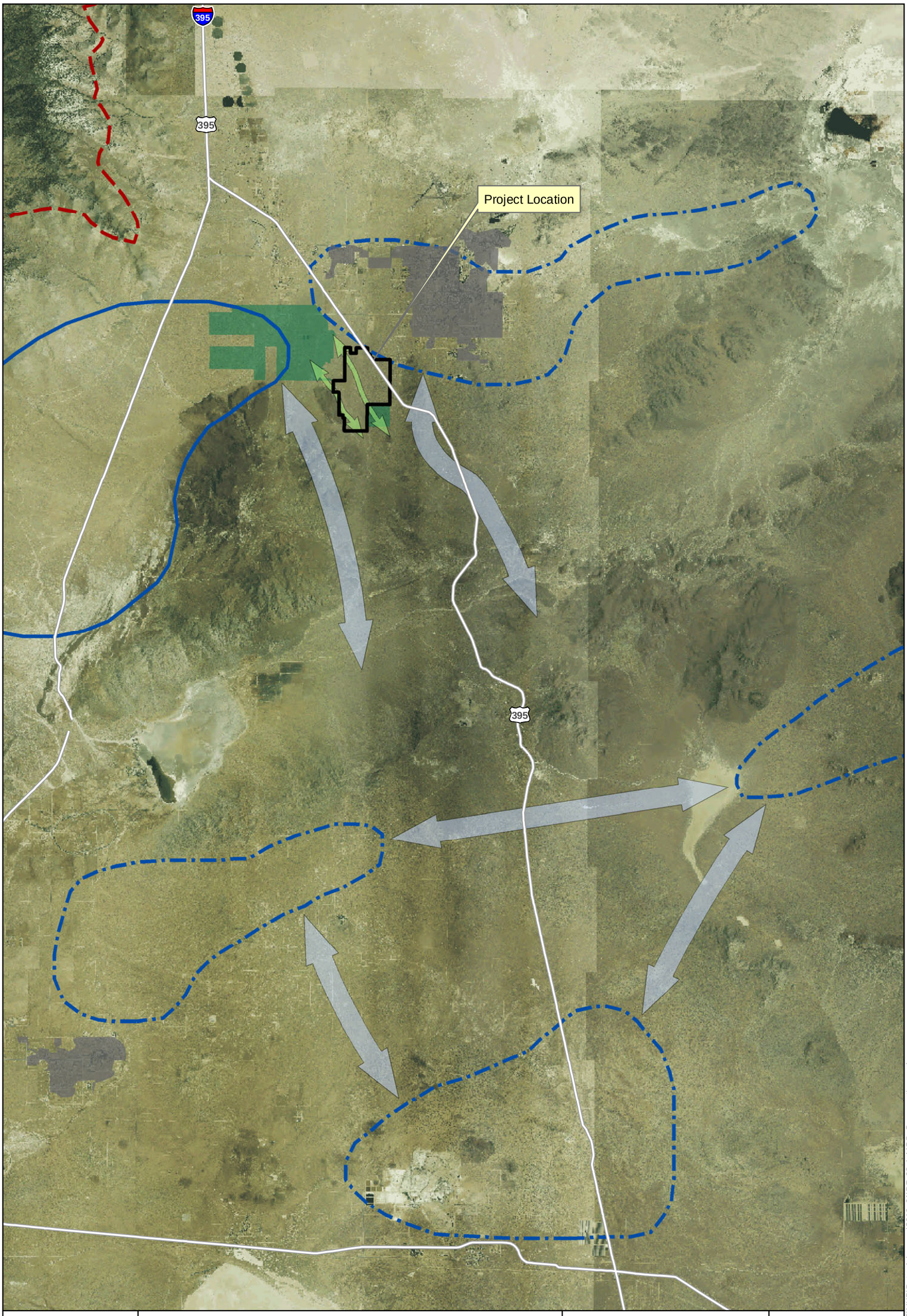
Source: Leitner 2008, BLM 2004, CaSIL 2008, ESRI 2008

Solar Millennium

AECOM

Date: January 2010

Y:\Projects\Solar_Millennium\RSPP\MXD\Data_Adequacy\2010_01\DR-68-3_MGS_Conservation.mxd



Map Location

Legend

- Potential Mitigation Land
- Potential Offsite Movement Corridors
- Potential Onsite Movement Corridors
- Identified Core Areas
- Other Known Populations
- Mohave Ground Squirrel Range

1 inch = 4 miles

0 2 4 8 Miles

Ridgecrest Solar Power Project
Responses to 12/22/09
Data Request

Figure DR-58-4
Mohave Ground Squirrel
Conservation

Source: Leitner 2008, BLM 2004, CaSIL 2008, ESRI 2008

Solar Millennium

AECOM

Date: January 2010

Y:\Projects\Solar_Millennium\RSPP\MXD\Data_Adequacy\2010_01\DR-68-4_MGS_Conservation.mxd

Attachment DR-BIO-65

Draft Channel Maintenance Plan

DRAFT
CHANNEL MAINTENANCE PROGRAM
RIDGECREST SOLAR POWER PROJECT

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January 2010

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LIST OF ACRONYMS

AFC	Application for Certification
BLM	Bureau of Land Management
BMPs	Best Management Practices
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CMP	Channel Maintenance Program
CWA	Clean Water Act
DT	Desert Tortoise
ESA	Endangered Species Act
IMP	Individual Maintenance Plan
RMP	Routine Maintenance Plan
ROWD	Report of Waste Discharge
RSPP	Ridgecrest Solar Power Project
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
USACE	U.S. Army Corps of Engineers
WDR	Waste Discharge Requirement

I. Channel Maintenance Program

A. Purpose

Ridgecrest Solar I, LLC (hereafter referred to as the Applicant), proposes to construct, own, and operate the Ridgecrest Solar Power Project (RSPP or Project). The Project would have a nominal output of 250 megawatts and consist of a single power plant utilizing two solar fields.

The RSPP site (Project site) is located in the high northern Mojave Desert in northeastern Kern County, California, about five miles southwest of the City of Ridgecrest, California (Figure DR-BIO-65-A-1). The Project right-of-way, for which the Applicant has applied to the Bureau of Land Management (BLM), includes approximately 3,995 acres of public lands owned by the Federal government. The Project facilities would occupy approximately 1,448 acres of the 3,995-acre site, and there would be a total disturbance area (including areas outside the facility fenceline) of approximately 1,944 acres.

The Channel Maintenance Program (CMP) provides for a comprehensive long-term management plan for channel maintenance-related activities that are associated with the Project. The purpose of this CMP is to provide for the maintenance of the engineered channels through and adjacent to the site. The objectives are to meet the channels' original design geometry to provide flood protection to the site.

This CMP describes the Applicant's long-term management strategy for maintaining the channels associated with the Project and discusses alternative channel maintenance techniques and documents policies and procedures. It would be used as a comprehensive guide for the Project's channel maintenance activities and to inform agencies and the public of practices and actions. This CMP, while long term in nature, is designed to accommodate new information or changes as developments occur. Revisions would be prepared, coordinated and distributed as necessary.

B. Drainage and Flood Control

For purposes of this report, the Project shown in Figure DR-BIO-65-A-2 will be referenced herein as "Project."

On-site flow patterns as indicated by aerial photography and vegetation patterns indicate that the overall drainage pattern inside the Project area concentrates flows in several well-defined washes through the area (Figure DR-BIO-65-A-3). Storm flows generated by the existing site itself generally sheet to washes in the northeast and northwest directions. See Figure DR-BIO-65-A-3 for the flow paths and flow spread across the site. Off-site hydrology drains a combined set of distinct watersheds totaling approximately 37 square miles, which generally drain from local topographic highs located south of the Project site northward to relatively more gradual-sloped areas at the southern and northern solar fields.

There are three watercourses that run through the Project site. The El Paso Wash, which drains 22 square miles upstream of the Project site (Area E2), runs approximately through the center of the Project site. This wash drains water from the south hills and crosses Brown Road northeast of the south solar field property boundary. Currently, the El Paso Wash flows over Brown Road at a low point in the road and continues sloping in a northwest direction along the Project site. An unnamed water course drains 4 square miles (Area E1) southwest of the Project site. This water course crosses the southwest section of the Project area continuing in the northwest direction toward Brown Road. A small water course drains 0.8 square miles toward the center of the southern field area (Area E1b). Collected water in this drainage area flows westward along the road, moving water away from the Project site. The eastern drainage area (Area E3) extends east and west of the U.S. Highway 395 (Three Flags Highway) covering 10 square miles. Drained water crosses U.S. Highway 395 at several points in both east-west and west-east direction, hydrologically connecting all the catchments in this drainage area. Water collected in this eastern drainage area flows westward toward the Project site from near the intersection of Brown Road and U.S. Highway 395. This water course crosses the Project site, changing flow direction from the westward direction to a more northward direction midway through the Project site.

An elevated railroad grade is located south of the Project site (Figure DR-BIO-65-A-3). 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.

Proposed drainage modifications to the Project seek to replicate the existing flow patterns as nearly as possible. For this reason, ten channels would be created adjacent to or across the Project area. These channels intercept the flows prior to their entry to the Project and convey them in natural re-aligned channels to where they exit the Project under existing conditions. On-site flows would be directed to these receiving dry washes to mimic existing conditions.

The Project would not change the existing upstream off-site drainage patterns. The existing downstream drainage patterns and flow rates would be slightly changed due to minor adjustments in the sub basin size through the creation of these ten diversion channels. These diversion channels would re-align the drainage pattern of the on-site flows. The proposed on-site drainage improvements seek to replicate the existing flow patterns as nearly as possible by being created within the same drainage areas as the existing dry washes (Figure DR-BIO-65-A-3). For this reason, ten channels have been proposed across the Project.

The ten engineered channels would be designed to move water through the Project area as swiftly as possible while preventing erosion and sedimentation to the extent practicable. The channels would be constructed with native on-site soil material, and scour protection would be added in stress areas (i.e., locations where the erosion potential is greater than a straight, uniform channel reach, and includes junctions, transitions, and curves). The channels are designed as

trapezoidal channels. No scour protection is proposed for the channel bottom in the straight sections of the channels (AECOM 2009a).

C. Goals and Objectives

This CMP has been prepared to provide a comprehensive approach to channel maintenance for the Project. The extent and frequency of maintenance activities are dependent upon many factors including the degree of flood hazard and the environmental impacts to natural habitats, water quality, sensitive species, and natural fluvial processes. This CMP is intended to achieve the following goals and objectives:

- Maintain the diversion channels to meet their original design to provide flood protection, support mitigation efforts, protect wildlife habitat, allow movement for large wildlife species, and maintain groundwater recharge.
- Develop a monitoring and reporting schedule and an outline for on-going routine maintenance of diversion channels to provide for public safety and protection of property.
- Develop a review process to simplify the authorization process required from State and Federal agencies with regulatory authority over wetlands for annual maintenance activities consistent with the Project.
- Minimize the disruption of adjacent property from diversion channel maintenance activities.

The engineered channels for this site are all relatively narrow in cross section and as such are not necessarily intended to serve as wildlife habitat or as mitigation. These engineered channels are all located on the periphery of the Project and outside the Project fence lines. They all have side slopes of 3:1 to allow for desert tortoise movement in or out of the channels and would be allowed to naturally re-vegetate to a minor extent, but not so much as to affect the drainage function of these engineered channels.

D. Annual Planning and Approval Process

This CMP includes a specific annual planning and approval process. The sequence of events in this process are summarized herein and discussed further in Section IV, Reporting Requirements – Step 1: Conduct Surveys and Develop Maintenance Projects; Step 2: Develop Annual Routine Maintenance Plans; Step 3: Public Review; Step 4: California Environmental Quality Act (CEQA) Compliance; and Step 5: Plan Approval.

E. Funding and Implementation Plan

The Applicant would be responsible for implementation of this CMP. The Project would retain a biologist with over three years of experience monitoring and reporting for native habitat mitigation programs (herein after referred to as a Designated Biologist). The Applicant would maintain the

diversion channels and undertake all activities needed in order to preserve the integrity, design, and discharge capacity of the diversion channels. The Applicant would be the financially responsible entity in charge of implementing all diversion channel maintenance activities.

II. STATE AND FEDERAL PERMITS

Most maintenance activities, which occur in natural water courses and involve modification to the channel bed, banks, and in-channel vegetation, are regulated by the California Department of Fish and Game (CDFG) under Section 1602 of the Fish and Game Code. Activities that result in the discharge of dredged or fill material into Federal natural water courses (such as bank stabilization and channel shaping) are regulated by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA). The Project would require a Section 401 Water Quality Certification from the Regional Water Quality Control Board (RWQCB) if a 404 permit were required from the USACE. The Project is not expected to require a 404 permit because the USACE is expected to agree with the Applicant's finding that there are no "jurisdictional waters of the United States" on the Project site. If no 404 permit is required from the USACE, the RWQCB would issue a Waste Discharge Requirement (WDR) under the requirements of the Porter-Cologne Act. The Applicant would submit a Dredge and Fill Permit to the RWQCB.

This CMP would require permits and review from various agencies, on an annual basis, such as those listed in Table DR-BIO-65-1.

Table DR-BIO-65-1
Agency Permits/Approvals

Agency	Permit/Approvals
USACE	Jurisdictional Determination of Isolated Waters (*only required once, at project inception*)
CDFG	1602 Streambed Alteration Agreement
RWQCB	Report of Waste Discharge Requirement

A. USACE-Regulated Activities

USACE-regulated activities under Section 404 involve a discharge of dredged or fill material including, but not limited to, grading, placing of riprap for erosion control, pouring concrete, laying sod, and stockpiling excavated material into waters of the U.S. Activities that generally do not involve a regulated discharge (if performed specifically in a manner to avoid discharges) include driving pilings, some drainage channel maintenance activities, constructing temporary mining and farm/forest roads, and excavating without stockpiling.

Based on the results of the Project's Jurisdictional Delineation Report (AECOM 2009b), the USACE is expected to make a formal determination that all waters delineated within the Project site are "isolated waters" not under the USACE's jurisdiction.

B. Regional Water Quality Control Board

The RWQCB regulates activities within State and Federal waters under Section 401 of the Federal CWA and the State Porter-Cologne Act.

Section 401 of the Clean Water Act

Section 401 of the CWA requires that "any applicant for a Federal permit for activities that involve a discharge to Waters of the U.S., would provide the Federal permitting agency a certification from the State in which the discharge is proposed that states that the discharge will comply with applicable provisions under the Federal Clean Water Act." Therefore, in California, before the USACE will issue a Section 404 permit, the Applicant must apply for and receive a Section 401 Water Quality Certification or waiver from the RWQCB.

Since waters delineated within the Project are expected to be considered "isolated" by the USACE, and thus not under the USACE's jurisdiction, a Section 401 Water Quality Certification is not expected to be required for the Project. USACE has not yet provided an official Jurisdictional Determination letter.

Porter-Cologne Act

The RWQCB regulates actions that would involve "discharging waste, or proposing to discharge waste, with any region that could affect the water of the state" (Water Code 13260(a)), pursuant to provisions of the state Porter-Cologne Act. "Waters of the State" are defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (Water Code 13050(e)). All parties proposing to discharge waste that could affect the quality of waters of the State would file a Report of Waste Discharge (ROWD) with the appropriate RWQCB. The RWQCB would then respond to the ROWD by issuing a WDR in a public hearing, or by waiving WDRs (with or without conditions) that propose discharge.

Since waters delineated within the Project are expected to be considered non-jurisdictional by the USACE, the Applicant must file a ROWD and obtain WDRs from the RWQCB prior to ground-disturbing activities.

C. California Department of Fish and Game

Pursuant to these sections, the CDFG regulates all changes to the natural flow, bed, or bank of any river, stream, or lake that supports fish or wildlife resources. A stream is defined broadly as a body of water that flows at least periodically, or intermittently, through a channel that has banks and that supports fish or other aquatic biota. Such areas are formally referred to as "waters of the State." Impacts to vegetation and wildlife from sediment, diversions, and other disturbances are included in the review.

As the Project contains "waters of the State," the Applicant has submitted a Streambed Alteration Agreement (SAA) application to the CDFG for construction. The SAA review process is subsumed within the California Energy Commission's (CEC's) review and approval process for the Application for Certification (AFC) (AECOM 2009c). A separate channel maintenance permit from CDFG would be needed for activities within the channels during operations (e.g., activities described in this CMP).

III. GUIDELINES AND STANDARDS FOR ROUTINE MAINTENANCE ACTIVITIES

This section describes the typical maintenance methods that would be utilized in maintaining the Project's diversion channels. Table DR-BIO-65-2 presents the generally anticipated maintenance methods and frequency for the maintenance activities of the diversion channels that would be maintained by the Applicant. The decision as to which technique and/or equipment would be used would ultimately be based upon the density and volume of accumulated material, the size of the channel, its flow-characteristics, and access conditions.

The engineered channels would be kept relatively free of impediments to flowing water, the original design geometry of the channel cross section would be maintained, erosion/scour damage to side slopes and channel bottoms would be kept at a minimum and vegetation/weeds would be managed. In-stream repairs would be promptly made to repair eroding banks and drop structures, erosion at storm drain outfalls, fences, incising toes of slopes and scoured channel beds. Trash and loose debris would be collected at a minimum on a monthly basis. Access roads would also be maintained as necessary to allow continuous monitoring of the channels. At a minimum, repairs and/or management actions need to be implemented when the problem 1) causes or could cause significant damage to the Project, adjacent property, or structural elements of the channels; 2) is a public safety concern; 3) negatively affects adjacent plant communities or poses a hazard to wildlife.

Dry channel conditions are anticipated for almost all maintenance work within the diversion channels. No mechanized equipment would be allowed to work within any wet channel areas, unless deemed necessary by the Project's Compliance Project Manager to respond to an emergency situation.

The Applicant would obtain and comply with all terms and conditions of each regulatory agency permit, including the CDFG 1602 SAA and the RWQCB WDR.

A. Preconstruction Biological Surveys and Avoidance Measures

Maintenance activities would require the use of equipment and have the potential to impact special-status plant and wildlife species. Therefore, a Designated Biologist would inspect all maintenance areas prior to the start of maintenance activities to determine if any special-status plants or wildlife species are present, or habitats for these species are present. If special-status plants or wildlife species are determined to be present, the Applicant would modify maintenance activities to avoid removal or substantial disturbance of the key habitat areas or features.

Table DR-BIO-65-2
Recommended Methods and Frequency of Maintenance Activities

Maintenance Category	Identification of Maintenance Problem	Recommended Maintenance Methods	Recommended Maintenance Frequency
Sediment Removal	Sediment comprises more than 10 percent of channel cross-section.	Monthly channel inspection. Remove sediment by hand tools for smaller channels. Remove sediment by hydraulic excavator for larger channels.	After rain events of 0.50 inches or greater, and on an as-needed basis.
Debris Collection and Blockage Removal	Culverts are clogged by straw, mud, dead animals, garbage, and/or aquatic plants.	Monthly channel inspection, trash and debris removal. Manual cleaning of culverts every two months, or as needed to minimize outlet clogging and prior to rainy season.	Prior to expected rain events of 0.50 inches or greater, and on an as-needed basis.
Repair and Installation of Fences, Gates & Signage	Holes, tears and/or broken fences, gates & signage.	Manually repair fences, gates and/or signage.	On an as-needed basis.
	Central Channel desert tortoise-proof fence.	Manually repair fence.	Monthly and immediately following rainfall events of 0.25 inches or greater.
Access Road Maintenance	Accumulation of debris, unsafe driving conditions present.	Repair access roads in order to maintain safe access to channels.	On an as-needed basis.
Vegetation/Weed Management	Weeds 15 inches in height or less within channel bed and/or on channel banks.	Mechanical removal by mowing.	On an as-needed basis.
	Weeds 15 inches in height or more within channel bed and/or on channel banks.	Manual removal with hand tools.	On an as-needed basis.
Erosion Control	Banks and embankment are deteriorated.	Riprap installation for deteriorated embankments (most common solution) or lining by plain concrete.	Infrequently needed, on an as-needed basis as determined by the Contractor to maintain bank stability.
	Embankment pitching is less than 15 inches.	Collect obstacles (trees, bushes, weeds, and silts) by crawler dozers.	On an as-needed basis and outside of the rainy season (October to April).
	Incising toes and/or scoured channel beds.	Rehabilitate bank and/or channel beds with compacted sand and coarse-grained gravels using motor grader, maintaining road slope as close to1 percent as possible.	On an as-needed basis and outside of the rainy season (October to April).

Avoidance and minimization measures would be described in the Annual Routine Maintenance Plan (RMP) for each maintenance activity. If a special-status plant species would potentially be affected, the Applicant would relocate the plant by cultivation or seeding methods to a suitable nearby site in coordination with CDFG. If a special-status wildlife species is determined to be present at a maintenance Project during the work period, the Designated Biologist would attempt to relocate the species or population per the Project's Desert Tortoise Relocation/Translocation Plan (DR-BIO-54, AECOM 2010a), Burrowing Owl Relocation/Translocation Plan (DR-BIO-56, AECOM 2010b), American Badger Relocation/Translocation Plan (DR-BIO-70, AECOM 2010c), and/or Desert Kit Fox Relocation/Translocation Plan (DR-BIO-77, AECOM 2010d) with approval from the CDFG or United States Fish and Wildlife Service (USFWS), as appropriate. This measure applies to all currently known special-status species that occur in the diversion channels, as well as special-status species that are recognized in the future. Endangered species experts with handling permits would be consulted during relocation efforts as described in the plans above to provide additional assurances that relocation is effective. Such consultation would include assistance in field efforts, as warranted.

B. Site Preparation and Access

Prior to initiating work for approved maintenance activities, the edge of the low-flow channel (if present) and a 10-foot buffer zone on each side of the low-flow channel would be clearly marked by the maintenance personnel using lath stakes with flagging (for no access by mechanized equipment). If no water is present in the channel, then the maintenance personnel would rely on the Designated Biologists' results of the Individual Biological Evaluation (refer to Section IV). The 10-foot buffer strip would be marked from the edge of the low-flow channel towards the bank. A single crossing through the surveyed channel would be allowed at each work site (one crossing at each maintenance site) for access to opposite sides of the channel. The crossing would be identified and clearly marked with lath and flagging for the equipment operator (Figure DR-BIO-65-A-4 and Figure DR-BIO-65-A-5).

C. Equipment

The types of equipment used in the course of maintenance activities may include, but are not limited to: backhoes, excavators, loaders, dump trucks, and bulldozers. Smaller equipment such as hand tools may also be used as appropriate.

D. Construction Monitoring

The Designated Biologist would be responsible for overseeing monitoring and compliance with protective measures for the biological resources. A Section 10(a)(1)(A) permit under the Federal Endangered Species Act (ESA) would be necessary for the monitoring or handling of federally listed species, otherwise a Designated Biologist would supervise maintenance activities to ensure compliance with Federal laws and regulations, such as the ESA and the CWA, as well as with State laws and regulations administered by the CDFG and the RWQCB. Maintaining

compliance requires an extensive authorization process each year for planned maintenance activities (refer back to Section II). The need for monitoring and the areas to be monitored would be determined during the Maintenance Activity Biological Evaluation (refer to Section IV). The objective of construction monitoring is to ensure that key habitat features or species locations are avoided to the maximum extent feasible.

The types of construction monitoring activities are summarized below and would be part of each Annual RMP:

Initial: Conducted as the first inventory assessment of a watercourse segment or after the implementation of a drainage improvement project.

Routine: Conducted on a cyclical (every 2-3 years) basis to assess current conditions and needed maintenance as determined by a Designated Biologist.

Event: Conducted after a significant flow or weather event that may have altered the existing conditions. A significant flow event is defined as a flow that is great enough to potentially alter or damage the diversion channel. Depending on the characteristics of a particular location in a diversion channel, a significant flow event can be associated with different flows.

Interim: Conducted upon the request of a concerned party or individual.

E. Maintenance Activity Categories

Repair and Installation of Fences, Gates & Signage

Fencing for the Project was designed so that the diversion channels carrying off-site drainage water would not be impacted by any obstruction that would preclude movement along or through the diversion channels. Fencing would be placed at the top of each channel beyond the channel maintenance road. The channels would be located outside of the facility's security fence; however, to ensure that no desert tortoise (*Gopherus agassizii* [DT]) or other small animals perish in the channels, a permanent DT-proof fence, or similar structure sufficient to exclude DTs, would be installed across inflow and outflow points of the central channel that traverse the solar fields to keep DT from entering.

At any location where a fence is required to cross a diversion channel for security reasons, a box culvert would be installed to allow unrestricted passage by wildlife within the diversion channel. Fencing would be provided at the perimeter of all the solar fields and other site improvements to preclude animals from coming onto the Project and potentially becoming injured (AECOM 2009a).

Following installation, the fencing, or similar structure, would be inspected monthly and immediately following rainfall events of 0.25 inches or greater. Damage to the fencing, or similar structure, would be repaired immediately and a clearance for any DTs that may be in the

channel would be conducted in all areas with shrub cover. A minimum of two clearance passes would be completed after the fencing, or similar structure, is repaired to ensure that no DTs entered the channel and become trapped inside. Any DT found would be moved by a Designated Biologist to a location immediately outside of DT-proof fencing, or similar structure, at the nearest channel inflow or outflow point using Agency-approved techniques (AECOM 2009a).

Where fences are installed, they would be maintained to provide warning and/or prevent unauthorized human or livestock entry. Gates and signs would be immediately repaired due to any vandalism, vehicular, or livestock damage.

Access Road Maintenance

Controls would be in place to minimize or eliminate soils from being tracked off site from vehicular traffic. A stabilized entrance/exit would be provided to clean vehicle wheels prior to exiting the Project. The majority of the Project would be stabilized with coarse gravel, except for paved access roads (AECOM 2009a).

The distance between access ramps to the diversion channels would be determined by balancing the impacts of driving equipment on the channel bed versus creating extra access points. Access ramps would be placed in areas with minimum potential for erosion. Access roads and ramps would be maintained in a manner that minimizes disturbance to native vegetation, wildlife, and aquatic organisms. The width of all new ramps would be minimized to the extent feasible. Paved access roads would be kept clean of earthen material and debris. The Project would be maintained so that a minimum of sediment-laden runoff enters the diversion channels.

Debris Collection and Blockage Removal

The engineered channels would be inspected monthly and all trash and loose debris would be collected and disposed of in a proper manner. Blockage removal would be conducted on an as-needed basis by the Applicant and would usually occur as a result of notification of a problem by a Contractor or public entity. Trash or vegetation debris may also cause a blockage and require more frequent removal. Trash and associated debris removal is necessary to maintain channel design capacity and storm drain outfalls. Spoils, trash, or any debris would be removed off site to an approved disposal facility. A trash abatement program would also be established (AECOM 2009a).

Sediment Removal

Sediment removal activities would be conducted within the diversion channels at their driest. The number of sediment removal projects undertaken and the quantity of sediment removed in a given year depends on the frequency and extent of past maintenance activities, as well as weather and hydrologic conditions during recent years. The channels would be provided with monitoring poles to gage the amount of sediment deposited within the channel. The poles would be set at

quarter mile intervals along the length of all constructed channels. At each quarter-mile location, the poles would be set at the toe of slope and the center of the channel and at not more than 50 foot increments spanning the width of the channel. Sediment removal needs following wet winter with higher than usual runoff, slope erosion, and sediment delivery to (and transport within) the diversion channel would likely be greater than maintenance requirements following an average or dry winter.

In most cases, larger equipment would operate within the channel itself. Equipment would enter the channel via an adjacent access road at various entry points (i.e. culvert crossings). The equipment would push the accumulated material with a bucket to a central location within the Project. From there, the material would be scooped up with a loader and loaded into a dump truck. The loaded dump truck would then leave the facility and transport the material to an approved off-site disposal area. Compostable green waste material would be taken to an approved composting facility, if available.

Erosion Control

Erosion and scour may be a problem in the desert environment. Prompt action would be taken when signs of erosion and scour first appear before they become major repairs. In addition to monthly inspections of the channels, inspections would be made after any significant rainfall event.

Erosion control would be performed as necessary within and adjacent to each diversion channel. Natural scouring and aggregation in the diversion channels is part of the natural successional processes. However, scour protection would be added in stress areas. A stress area is defined as a location where the erosion potential is greater than a straight, uniform channel reach, and includes junctions, transitions and curves. Highly erodible areas such as the sweeping turns in the rerouted channel may be reinforced with riprap, if erosion is determined to be a recurring problem area. Since the slope of the upper banks would be mild (4:1 or less), it is not necessary to include riprap along the straight portions of the upper banks (AECOM 2009a).

Erosion concerns for the Project focus on those situations where infrastructure (access roads, fencing, etc.), solar facilities, or off-site property could be damaged or compromised if repairs are not made. Any identified erosion problems would be addressed in a timely manner. Erosion control materials include, but are not limited to, natural fiber matting, rock or riprap, straw wattles, vegetation bundles, gravel bags, gully repair, collection/retrieval of sediment, and seeding. Weed-free fiber matting and rice straw or other certified weed-free materials may be used. The channel bottom widths were set to promote relatively shallow flows. This was done to help minimize erosive forces and to shorten the daylight length required at the downstream end of the channel (AECOM 2009a).

Erosion control minimization measures would take wildlife movement into consideration. No erosion control method would inhibit the passage of wildlife species across the Project and each would ensure proper crossing routes through the diversion channels. In order to minimize the impact of maintenance activities on the environment, erosion control measures would incorporate the following protocols, as appropriate.

- Minimize new ground disturbance to the maximum extent feasible, through efforts such as limiting grading to the minimum area required, and restricting vehicle access and maneuvering to designated areas.
- Minimize maintenance activities during the rainy season (October to April).
- When maintenance activities cannot be avoided during the rainy season, prepare and implement a "weather triggered" action plan for activities to provide enhanced erosion and sediment control measures prior to predicted storm events (i.e., 40 percent or greater chance of rain).
- Schedule grading, earth disturbing and restoration activities as far in advance of the start of the rainy season as feasible, to maximize the opportunity for vegetation to reestablish prior to the advent of storm runoff.
- During maintenance activities, use sediment controls within channels, access roads and staging areas to prevent off-site sediment transport, including measures such as silt fence, fiber rolls, gravel bags, etc. Remove temporary erosion control measures upon completion of maintenance.
- Provide appropriate training for personnel responsible for Best Management Practices (BMP) installation and maintenance.
- Monitor erosion control measures during the rainy season to ensure their effectiveness.
- Comply with local dust control requirements, including measures such as material stockpile and restriction of grading during high winds.

Bank Stabilization

Bank stabilization involves the repair and stabilization of eroded or eroding channel banks. Destabilized banks that are not repaired would continue to erode and shed sediment into the diversion channels. The banks along the diversion channels would be routinely repaired and stabilized to reduce the potential for eroding banks, incising toes and sourced channel beds. Eroding banks that are not repaired would continue to destabilize and deposit sediment into the diversion channels.

The Project would need to implement, at a minimum, in-channel repairs or management action when the problem could:

- Cause significant damage to the Project, adjacent property, or the structural elements of the diversion channel;
- Cause a public safety concern;
- Negatively affects groundwater recharge; and
- Negatively affects adjacent plant communities or poses a hazard to wildlife.

The construction of bank protection measures would be limited to situations when banks are vulnerable to continued erosion which could cause a threat to critical public infrastructure and/or valuable habitat, and it has been determined that natural slope settling would not achieve the necessary stability. The Applicant would evaluate different types of bank protection methods, then select one that is most suitable based on the following order of decreasing preference: (1) ungrouted rip rap with vegetation; (2) pipe and wire revetment while retaining vegetation; (3) grouted rip rap; and (4) concrete sackwalls, gabion walls, soil cement, and gunite.

Hard bank protection such as grouted and ungrouted rip rap, pipe and wire revetment, gunite, concrete sackwalls, gabion walls, and soil cement would only be used if it is determined that the above methods would not achieve the desired results, are not cost effective, are logistically or technically infeasible, and/or would create greater incidental environmental impacts.

Nonnative Vegetation Management

Invasive nonnative (weed) species would be eradicated wherever they occur in or adjacent to (i.e., within 10 feet) each diversion channel. Colonization of an area by weeds is most likely to occur in the periods after disturbance (e.g., after the rerouted wash is graded and newly established). It is anticipated that vegetation or weed control would not be of concern until at least the second year after the channels are constructed due to the slow growth in the desert ecosystem. The proposed initial control after the diversion channel is established would enhance the function of the channels by maintaining positive conditions for natural flow regimes, and by removing competing nonnative plants and providing substrate for native plants to regenerate naturally. In addition, nonnative plant control on site would reduce weed propagules that would otherwise be transported downstream.

For the purposes of this CMP, nonnative plant species that require control include those species listed in Table DR-BIO-65-3. Please refer to the Weed Management Plan for further details (DR-BIO-69) (AECOM 2010e).

Table DR-BIO-65-3 Weed Species Observed within Project Boundaries

Scientific Name	Common Name
Festuca sp.	Fescue
Schismus sp.	Mediterranean grass
Brassica tournefortii	Saharan mustard
Salsola tragus	Russian thistle, tumbleweed
Tamarix aphylla	Athel tree

Source: AECOM. 2009d. Ridgecrest Solar Power Project Biological Technical Report, Riverside County, California. Prepared for Ridgecrest Solar I, LLC. August.

The following weed control avoidance and minimization measures would be followed:

- Invasive weeds would be controlled by herbicide spraying or hand-pulling. Weeds would be controlled prior to seed set to reduce competition with native plants.
- Herbicide use would be conducted by workers trained in native and invasive weed plant identification. Care would be taken when spraying herbicides to avoid native plant species.
- Herbicide would not be applied during periods of precipitation or on windy days.
- If herbicide is sprayed when standing water is present, a non-water soluble herbicide would be used such as Rodeo or Aquamaster.
- Workers would also have received annual training in herbicide use and safety. The supervisor of the workers would possess a Qualified Applicators Certificate and/or License. Recommendations for herbicide use would be written by a licensed Pest Control Advisor and submitted to the County Agricultural Advisor.
- All weed debris would be collected and properly disposed of off site (refer back to Section 3.5.3).

Native Vegetation Management

Maintenance of native vegetation on the channel banks is prescribed in order to reduce the hydraulic roughness, improving flood conveyance capacity, but to also maintain adequate cover to protect stream banks from erosion. Maintenance of native vegetation above the toe of the bank would conform to the same prescriptive requirements as designated for native vegetation removal in the buffer zone. Vegetation maintenance can be performed by mechanized equipment or by hand tools.

The Applicant would remove no more native vegetation from the channel bottom than is necessary to achieve the specific maintenance objectives (i.e., removing obstructive vegetation or silt-trapping vegetation). Brushing and herbicide application for vegetation control on the channel bottom would be conducted in a manner that allows small patches of in-channel native vegetation to persist.

The Project Contractor and employees would maintain native vegetation within the buffer zone and between the buffer zone and below the toe of the channel bank. The Contractor also has the option of thinning vegetation above the toe of the channel bank. This action would occur only after it has been determined necessary, during the site screening, in areas where vegetation maintenance in combination with sediment grading activities do not meet a reasonable flood flow standard.

A 10-foot wide buffer zone would be maintained on either side of the low-flow channel. The buffer zone would be delineated in the Individual Maintenance Plan (IMP) (refer to Section IV). However, when maintenance actually begins, regardless of the IMP, the physical edge of water (if present) would be flagged and used as the definitive boundary for the 10-foot wide buffer zone. Maintenance of native vegetation within the 10-foot wide buffer zone would conform to the following prescriptive requirements and would be performed by hand only.

Vegetation maintenance can be accomplished using either hand or mechanical methods, but no equipment would be allowed in the wetted channel areas. Mechanized and/or hand removal of vegetation may be conducted on the channel bottom and sandbars within areas below the banks and away from the surveyed low-flow dry channel and the 10-foot buffer zone. To the extent possible, roots of native species would be left intact within the sediment surface to minimize suspended sediment and changes to channel morphology during elevated flows. The preferred method of vegetation removal below the toe of the bank would be mowing.

Coordination with CDFG would occur and the CEC License would be consulted for further details on mitigation measures related to special-status plants found within the diversion channels (AECOM 2009c).

IV. REPORTING

A. Annual Planning and Approval Process

This CMP includes a specific annual planning and approval process. The sequence of events in this process is summarized below:

Step 1: Conduct Survey and Develop Maintenance Projects

Each year, surveys of the diversion channels would be conducted. These are labor-intensive field investigations to identify areas that may require maintenance and to gather information on Project conditions. An assessment of the need for maintenance would be prepared using principles of engineering and stream geomorphology. The nature and extent of the proposed maintenance activities would be described. Please refer to Attachment DR-BIO-65-B, which contains a sample Maintenance Activity Report Form.

Biological field surveys would be conducted by a Designated Biologist to determine the presence of any sensitive species that may be impacted by maintenance activities. Impacts of the proposed actions would be evaluated and mitigation measures identified. A map of the proposed maintenance activity areas would be developed, as well as documentation of any biological field investigations. Please refer to Attachment DR-BIO-65-C, which contains a sample Maintenance Activity Biological Evaluation Report Form.

Additionally, surveys and minimization measures would be conducted in compliance with all applicable permit conditions.

Step 2: Develop Annual Routine Maintenance Plan

An Annual RMP would be prepared by Project staff each year (and would be submitted to the CEC Compliance Manager for approval) which would include the following Sections:

- Section 1: Introduction and summary of planned maintenance activities.
- Section 2: Notice of Exemption and description of exempt drainages (if applicable).
- Section 3: Reference to other environmental documents, as needed.
- Section 4: Impacts analysis and applicable mitigation measures identified by the Designated Biologist.
- Section 5: Photographs and reporting forms.
- Section 6: Copies of applicable agency approvals/permits obtained.

Step 3: CEQA Compliance and Regulatory Agency Permit Approvals

The CEC is the lead agency under CEQA and has a certified regulatory program under CEQA. Under its certified program, the CEC is exempt from having to prepare an Environmental Impact Report. Its certified program, however, does require environmental analysis of the Project, including an analysis of alternatives and mitigation measures to minimize any significant adverse effect the Project may have on the environment.

As a CEQA lead agency, the CEC has the authority to determine which maintenance activities and projects are exempt from CEQA. Maintenance projects that are exempt from CEQA generally include the following categories of activities, as described in Annual RMPs.

Rubbish Removal. Removal of rubbish or other unnatural material from the riparian corridor.

Concrete Channels. Maintenance activities in fully concrete-lined channels without habitat.

Flood Control Devices. Cleaning, repair, and replacement of such flood control devises as check structures, drop structures, chute structures, culverts, weirs, or stream flow measures stations.

Access Ways. Maintenance activities on access ways or roads outside of riparian corridor.

Earthen Channels. Maintenance activities in earthen channels, which have been developed to convey stormwater and that support little to no vegetation and do not support listed species.

Unvegetated Basins. Maintenance activities in sediment, debris, and retention basins which have been constructed for such purposes and which support little to no vegetation and do not support listed species.

Non-exempt projects are subject to environmental review in the Annual RMP to be approved by the CEC. Addenda are prepared by Project staff for each maintenance project, which would include the following elements:

- Project description,
- Wildlife and plant surveys,
- Cultural resource surveys,
- Engineering analysis, and
- Impact analysis and mitigation measures.

As noted above, the Annual RMP includes a description of each maintenance project to be conducted. In addition, it represents the environmental documentation required to comply with CEQA. Once the CEC has approved the maintenance activities, application can be made to the BLM (land owner), CDFG, USACE and RWQCB for environmental permits and/or approvals.

Applicable permits must be obtained from local, State and Federal regulatory agencies prior to project implementation.

Step 4: Plan Approval

The Annual RMP would be revised to respond to any CEC comments, and would then be presented to the CEC for approval each year.

B. Report Requirements

Annual Routine Maintenance Plan

On an annual basis, the Applicant would determine which diversion channels require maintenance in the coming year. Once the maintenance activities are identified, the following series of actions would be undertaken for each proposed maintenance activity carried out in accordance with this CMP.

Individual Maintenance Plan

An IMP would be prepared for each maintenance activity every year identified under the Annual RMP. Each IMP would identify the following:

- Width of channel clearing;
- Maintenance method(s) to be used;
- Equipment type; access roads/paths;
- Staging areas;
- Spoils storage sites; and
- Schedule.

As appropriate, the IMP would incorporate construction BMPs required by the RWQCB to prevent pollutants from entering the diversion channels, and the CDFG to prevent further impacts to streambeds and banks. The maintenance requirements would be based on empirical and/or quantitative evaluation of what is required to achieve the desired flood control capacity of the diversion channels. The goal of the IMP would be to, wherever possible, minimize the amount of clearing in order to reduce impacts on biological resources while providing adequate flood control capacity. The IMP would utilize existing access roads within environmentally sensitive lands to minimize the need for creating new access paths.

Maintenance Activity Biological Evaluation

The location of each proposed activity would be inspected by a Designated Biologist to determine whether sensitive biological resources could be affected by the proposed maintenance activity.

A Maintenance Activity Biological Evaluation Form would be prepared for each facility where the Designated Biologist determines that the proposed maintenance activity could affect sensitive biological resources. The Maintenance Activity Biological Evaluation Form would include:

- A summary of the biological resources associated with the diversion channel;
- Quantification of potential impacts to sensitive biological resources; and
- Mitigation measures, if applicable, required which compensate for those impacts.

The Maintenance Activity Biological Evaluation Form would also identify which CMP guidelines and standards would be incorporated into the proposed maintenance activity. Please refer to Attachment DR-BIO-65-C, which contains a sample Maintenance Activity Biological Evaluation Form.

Table DR-BIO-65-4 would be consulted to score the quality of each maintenance site and to quantify the condition of each diversion channel inspected to prioritize maintenance activities. Table DR-BIO-65-5 would be consulted to assess which type of channel monitoring and maintenance activities are recommended.

Annual RMP Plan Approval

Prior to commencing any maintenance activity that was determined in the Maintenance Activity Biological Evaluation Form to potentially impact biological resources, USACE and/or RWQCB and the CDFG would review the Annual RMP. The Applicant must verify that the proposed maintenance activities and mitigation measures are consistent with the analysis contained in the AFC (AECOM 2009c). No maintenance activities would be undertaken until these entities have indicated their approval of the relevant Annual RMP.

Prior to commencing any maintenance activity that was determined in the Maintenance Activity Biological Evaluation Form to potentially impact biological resources; the mitigation measures identified in the Maintenance Activity Biological Evaluation Form would be carried out. In general, the boundaries of sensitive biological resources that are to be avoided must be clearly delineated with flagging, signage and/or fencing.

Monitoring and Reporting Schedule

A Status Report for maintenance activities of significance in any 30-calendar day period is to be submitted to the Compliance Project Manager at least 15-calendar days prior to undertaking the maintenance. Activities of significance are defined as: 1) Sediment removal exceeding 500 cubic yards, 2) Weed or vegetation eradication covering more than 5 gross acres, 3) Debris removal exceeding 100 cubic yards, and 4) Erosion/scour remediation exceeding 500 cubic yards of new material. An initial report would be prepared indicating the extent of the planned maintenance activity, location on the site, projected starting and completion dates, and the

disposal method/location for any material being removed from the channels. A final report would be submitted to the Compliance Project Manager within 15 calendar days of completion of the maintenance activity that summarizes the final extent of the maintenance undertaken.

An Annual Report of Maintenance Activities is to be submitted to the Compliance Project Manager by January 31 of each year. The Annual Report would report on the maintenance activities undertaken on each of the three channels. The report would include for each channel: 1) An evaluation of the condition of the channel for each monitoring standard, 2) A summary of Status Reports, and 3) An estimate of planned maintenance activities for the next year including activities of significance. In addition, ground and or aerial photos would be included to illustrate the state of the channels.

Construction activities would be monitored full time during start up and during any in-stream works or sensitive activity, otherwise on a daily basis to the completion of the Project. As required, the Designated Biologist would be on site during maintenance activities, where these resources are determined to be present, to assure that required mitigation measures are followed. At the end of the monitoring period, the Designated Biologist would prepare a letter report summarizing the results of the monitoring and any remedial actions that were carried out.

Table DR-BIO-65-4
Channel Condition Assessment Ratings

Rating	Condition	Description of Observations	Recommended Action Option
6	Good	Channels do not exhibit erosion/scour, sediment accumulation, debris build-up, or resistance to flow. Structural controls may show minor deterioration, but all components are stable.	Routine Monitoring
5	Satisfactory	Channels exhibit minor erosion/scour, sediment accumulation, debris buildup, or resistance to flow. Structural controls exhibit limited, minor defects or deterioration, such as corrosion, overstressing, and movement.	Routine Monitoring
4	Fair	Channels exhibit increased scour, sediment accumulation, debris buildup, or resistance to flow. Minor deterioration may be observed to conveyance structures. Structural controls are sound and stable, but minor to moderate defects or deterioration is observed. Localized areas of moderate to advanced deterioration may be present but do not significantly reduce the ability of the structure to function as intended.	Increased Monitoring Frequency
3	Poor	Channels exhibit scour, sediment accumulation, debris buildup, and resistance to flow. Moderate deterioration is observed to conveyance structures. Conveyance and flow structures not functioning as intended. Structural controls exhibit advanced deterioration or overstressing, but structure is functioning as intended. Maintenance/repairs may need to be performed with moderate urgency to avoid further deterioration or increased likelihood of flooding.	Maintenance/ Repair
2	Serious	Channels exhibit serious scour, sediment accumulation, debris buildup, and resistance to flow. Advanced deterioration is observed to conveyance structures. Conveyance and flow structures not functioning as intended. Structural controls exhibit advanced deterioration, overstressing, or breakage. Repairs may need to be performed on a high-priority basis with urgency. Conditions may result in flooding.	Redesign/ Replacement
1	Critical	Channels exhibit critical scour, sediment accumulation, debris buildup, and resistance to flow. Advanced deterioration is observed to conveyance structures. Conveyance and flow structures not functioning as intended. Structural controls exhibit extreme deterioration, overstressing, or breakage and have resulted in localized failure(s). Repairs may need to be performed on a very high priority basis. Flooding is imminent.	Redesign/ Replacement

Table DR-BIO-65-5
Recommended Channel Monitoring and Maintenance Options

Action Options	Description
Routine Monitoring	Recommended when no further action is necessary until the next scheduled routine inspection.
Increased Monitoring Frequency	Recommended when no further action is necessary, but shorter inspection schedule is warranted to monitor potential problems.
Maintenance/ Repair	Recommended whenever monitoring deems necessary. The Project's Compliance Project Manager would determine and notify the responsible party for maintenance.
Redesign/ Replacement	Recommended whenever monitoring deems necessary. The Project's Compliance Project Manager would determine priority and implement action. Depending on the specific conditions, several phases may be utilized, such as: ***Engineering Evaluation**:* Recommended whenever significant damage or defects are encountered that require an evaluation to quantify the existing condition, determine whether repairs are required, or determine which method of repair is appropriate. ***Special Investigation**:* Recommended to determine the cause or significance of a typical deterioration, before designing repairs. Special analysis, monitoring, or field data gathering is typically required. This may include surveys, soil borings, etc. ***Repair Design Inspection**:* Recommended immediately prior to, or during the preparation of necessary design documents. ***Develop Design Documents**:* Recommended after all evaluations, investigations, and inspections have been completed. Indicates that the field data has been collected and that the watercourse is ready to have repair documents prepared.
Emergency Action	Recommended whenever an unsafe condition is observed. If the situation is life threatening or if significant property damage or environmental damage may occur, the Project's Compliance Project Manager would be contacted immediately.

V. REFERENCES

AECOM

2009a Ridgecrest Solar Power Project Drainage Report. Prepared for Ridgecrest Solar I, LLC. July.

2009b Ridgecrest Solar Power Project Jurisdictional Delineation Report for Regulated Waters of the U.S. and State. Prepared for Ridgecrest Solar I, LLC. August.

2009c Ridgecrest Solar Power Project Application for Certification. Prepared for Ridgecrest Solar I, LLC. Submitted to California Energy Commission. August.

2009d Ridgecrest Solar Power Project Biological Technical Report, Riverside County, California. Prepared for Ridgecrest Solar I, LLC. August.

2010a Ridgecrest Solar Power Project Desert Tortoise Relocation/Translocation Plan. Prepared for Ridgecrest Solar I, LLC. January.

2010b Ridgecrest Solar Power Project Burrowing Owl Relocation/Translocation Plan. Prepared for Ridgecrest Solar I, LLC. January.

2010c Ridgecrest Solar Power Project American Badger Relocation/Translocation Plan. Prepared for Ridgecrest Solar I, LLC. January.

2010d Ridgecrest Solar Power Project Desert Kit Fox Relocation/Translocation Plan. Prepared for Ridgecrest Solar I, LLC. January.

2010e Ridgecrest Solar Power Project Weed Management Plan. Prepared for Ridgecrest Solar I, LLC. January.

ATTACHMENT DR-BIO-65-A

FIGURES

Ridgecrest Solar Power Project Responses to 12/22/09 Data Requests

Figure DR-BIO-65-1 Regional Map

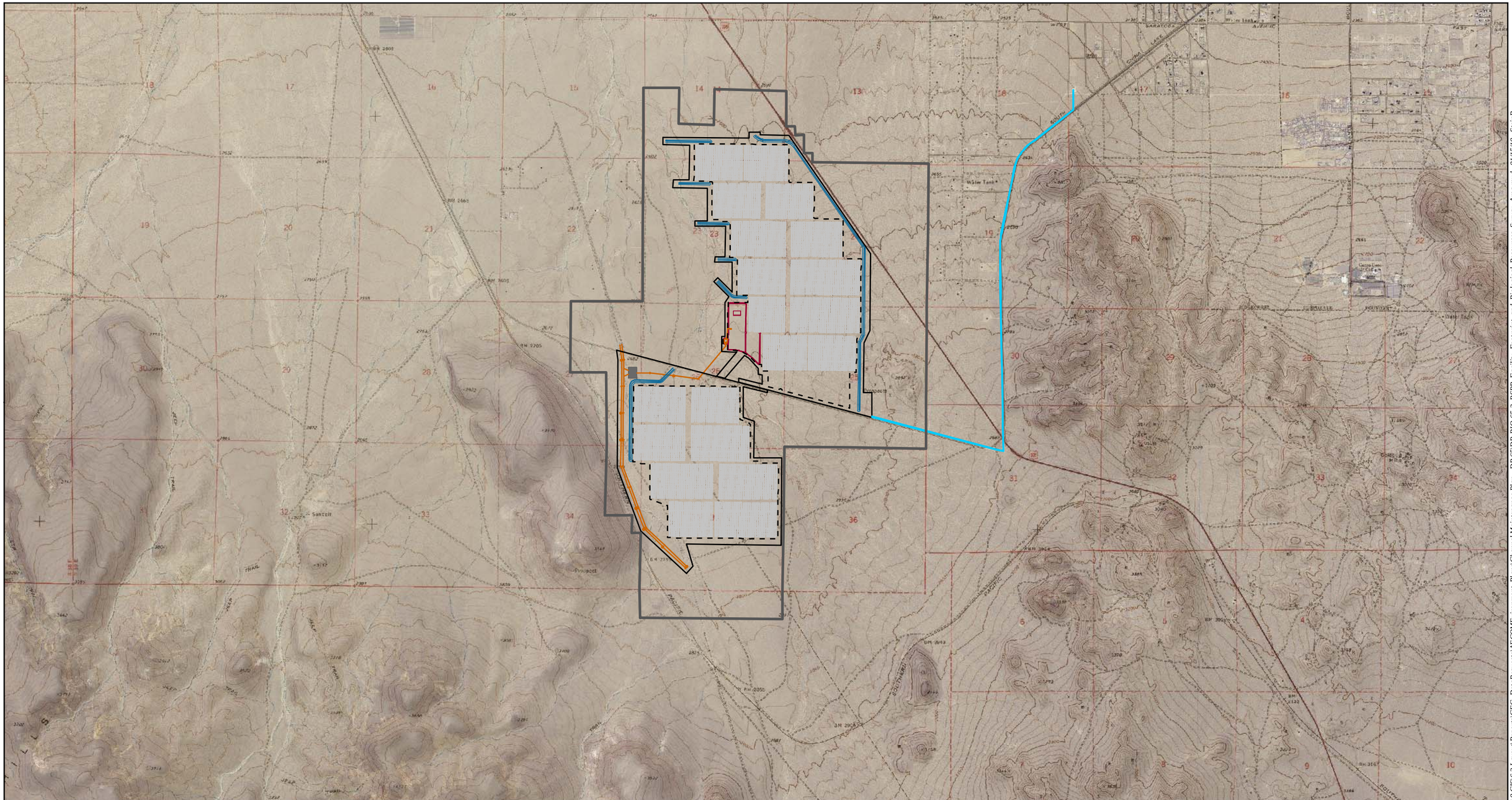
Source: ESRI; AECOM 2009

Solar Millennium

AECOM

Date: January 2010

Path: P:\2009\09080080 Sol Mil Ridgecrest\6.0 GIS\6.3 Layout\Reports\CEC_DataRequests\AECOMEvironment_Plans\Channel Maintenance Plan - DR 65\DR-BIO-65-1_RSPP_RegionalLocation.mxd, 01/14/10, johnsonaa



Map Location

Legend

- ROW
- Facility Footprint
- Reconfigured Disturbance Area
- Water Line Disturbance Area

Proposed Project Elements

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

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 Responses to 12/22/09 Data Request

Figure DR-BIO-65-2 Proposed Project Elements and Project Area

Solar Millennium

AECOM

Date: January 2010

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Map Location

Legend

- Facility Footprint
- Reconfigured Disturbance Area
- Water Line Disturbance Area
- Surveyed Disturbance Area

Source: NAIP 2005; AECOM 2010

N W E S

1 inch = 400 feet

0 400 800 1,200 1,600 Feet

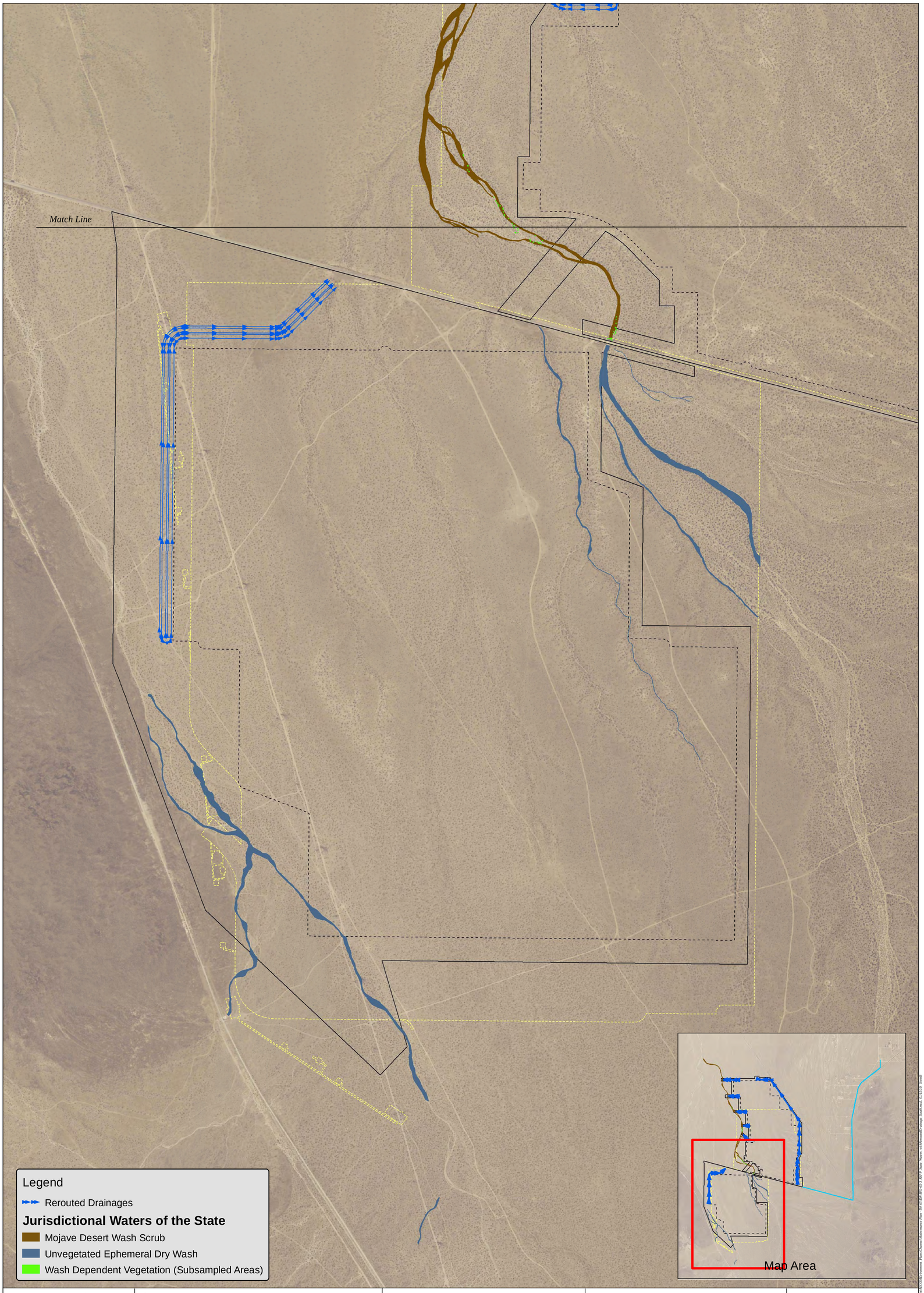
Ridgecrest Solar Power Project
Responses to 12/22/09
Data Request

Figure DR-BIO-65-3
Jurisdictional Waters of the State and Rerouted Drainages
Northern Extent

Solar Millennium

AECOM

Date: January 2010



Map Location

Legend

- Facility Footprint
- Reconfigured Disturbance Area
- Water Line Disturbance Area
- Surveyed Disturbance Area

Source: NAIP 2005; AECOM 2010

N
W E
S

1 inch = 400 feet

0 400 800 1,200 1,600 Feet

Ridgecrest Solar Power Project
Responses to 12/22/09
Data Request

Figure DR-BIO-65-3
Jurisdictional Waters of the State and Rerouted Drainages
Southern Extent

Solar Millennium

AECOM

Date: January 2010

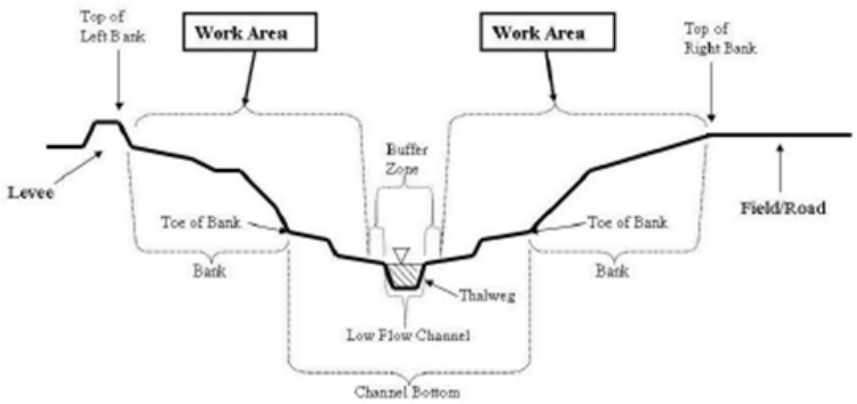


Figure DR-BIO-65-4 - Dry River Channel Conditions

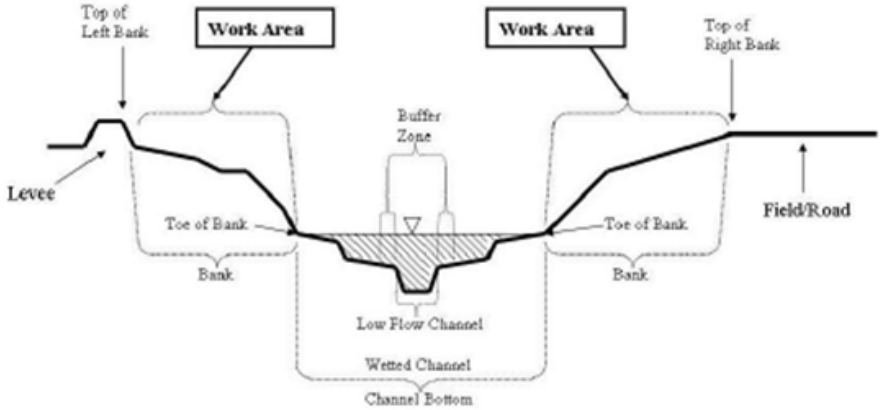


Figure DR-BIO-65-5 - Wet River Channel Conditions

Path: P:\2009\09080080 Sol Mil Ridgecrest\6.0 GIS\6.3 Layout\Reports\CEC_DataRequests\AECOMEvironment_Plans\Channel Maintenance Plan - DR 65\DR-BIO-65-4and5_Dry-Wet Channel graphic.mxd, 01/07/10, johnsonaa

ATTACHMENT DR-BIO-65-B

SAMPLE MAINTENANCE ACTIVITY REPORT FORM

Maintenance Activity Report

Site Name/Facility_____

Date_____

District Representative_____

Instruction: *This form must be completed whenever any work is done at in a diversion channel. Attach additional sheets if needed.*

Description of Work (e.g., routine, re-occurring; also note general frequency maintenance at this site)	
Location of Activity: West Side Channel _____East Side Channel _____Center Channel_____ Latitude:_____ Longitude:_____	
Maintenance Facility Type: Channel:_____ Culvert:_____ Other:_____	
Describe Ground Disturbing Activities: Length:_____	Is Drainage Lined: ____Yes ____No Notes:_____
Access Via Previously Disturbed Area: ____Yes ____No Access Route: _____	Maintenance Equipment Used:
Vegetation Removal (if applicable): Type of Vegetation Removed:_____ Linear Length (in feet): _____	
Were Erosion Controls Necessary? ____Yes ____No	Describe Interim Erosion Control Measures (if applicable):
Work to be conducted during nesting bird season (Feb-August)? ____Yes ____No	Biologist/Monitor Present? ____Yes ____No Names:_____
Water Quality Sampling Required? ____Yes ____No	**Attach photographs of each maintenance activity work area.*

Additional Maintenance Activity Description:

_____
_____
_____
_____
_____
_____

Describe surrounding land use within work area (assume 500-foot buffer area):

_____
_____
_____
_____
_____
_____

Identify temporary/permanent impacts to habitat by area (acres/square footage) as determined by Biologist:

_____
_____
_____
_____
_____
_____

Reviewer Recommendations (Avoidance, Minimization, and Mitigation Measures:

_____
_____
_____
_____
_____
_____

Additional Comments (Describe unusual conditions, situations or special requirements needed to do the work such as diversion of water, construction staging area, replacement of bank material, presence of utilities, etc.)

_____
_____
_____
_____
_____
_____

ATTACHMENT DR-BIO-65-C

SAMPLE MAINTENANCE ACTIVITY BIOLOGICAL EVALUATION FORM

Maintenance Activity Biological Evaluation Report Form

Site Name/Facility_____

Date_____

Biologist(s) Name_____

Instruction: *This form must be completed for each target maintenance activity area following the completion of the Individual Maintenance Plan (IMP) Report form and prior to any work being conducted. Attach additional sheets if needed.*

Habitat Description (vegetation communities, including adjacent uplands; general habitat quality; anticipated level of disturbance):	
Wildlife Species Observed/Detected During Field Visit (Including Habitat Type)	
Types/Amount of Wetland Vegetation to be Removed (in acres/square feet) Riparian Forest/Riparian Woodland_____ Riparian Scrub_____ Freshwater Marsh/Emergent Wetland_____ Cismontane Alkali Marsh_____ *Arundo donax*-Dominated Disturbed Wetland_____ Other Disturbed Wetland_____ Streambed/Unvegetated Drainage_____	
Types/Amount of Upland Vegetation to be Removed/Disturbed for Maintenance Activity Access:	
Sensitive Plant Species Observed? _____Yes _____No	Sensitive Wildlife Species Observed?_____Yes_____No
Is there moderate or high potential for listed wildlife species to occur in or adjacent to the impact area? _____Yes _____No If Yes, which species? _____	
Could work be conducted during the bird breeding season without the need for a pre-construction nesting survey? _____Yes _____No If yes, provide jusitification:_____	
**Attach photographs of each maintenance activity work area.*	

Maintenance Protocols (list the applicable maintenance protocols based on the biological resources occurring or likely to occur on site):

_____
_____
_____
_____
_____
_____

Habitat compensation requirements (including wetland enhancement, restoration, creation, and/or purchase of wetland credits in a mitigation bank; etc.):

_____
_____
_____
_____
_____
_____

Additional Biologist Recommendations:

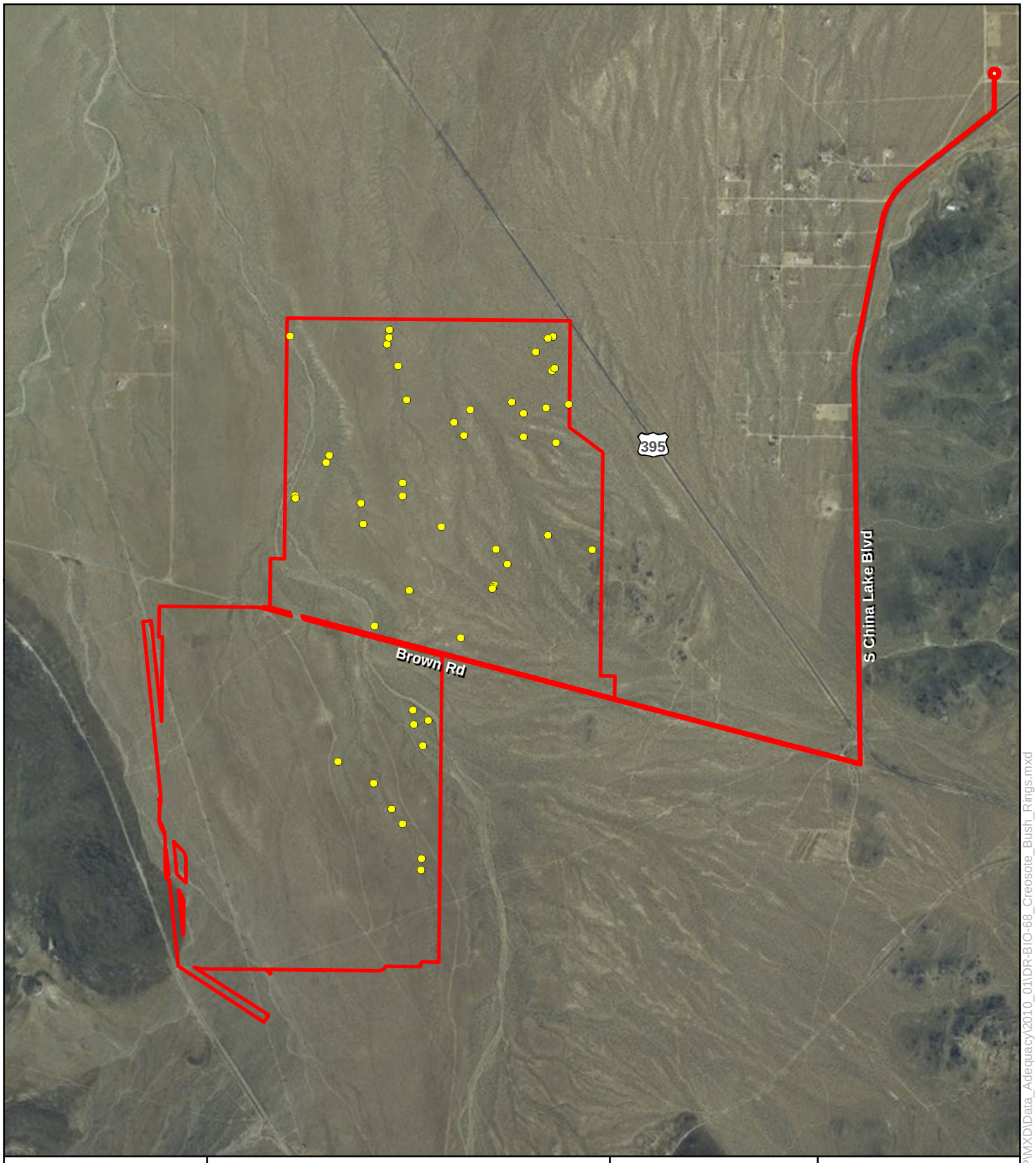
_____
_____
_____
_____
_____
_____

Additional Comments:

_____
_____
_____
_____
_____
_____

Attachment DR-BIO-68

Figure



Map Location

Legend

Disturbance Area

Potential Creosote Bush Ring

1 inch = 0.5 miles

0 0.25 0.5 1 Miles

N W E S

Ridgecrest Solar Power Project

CEC Data Request Figure DR-BIO-68 Creosote Bush Rings

Source: ESRI 2009, AECOM 2009

Solar Millennium

AECOM

Date: January 2010

Y:\Projects\Solar_Millennium\RSPP\MXD\Data_Adequacy\2010_01\DR-BIO-68_Creosote_Bush_Rings.mxd

Attachment DR-BIO-69

Draft Weed Management Plan

DRAFT
WEED MANAGEMENT PLAN
RIDGECREST SOLAR POWER PROJECT
Docket 09-AFC-9

Prepared for:
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January 2010

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LIST OF ACRONYMS

AFC	Application for Certification
BLM	Bureau of Land Management
Cal-IPC	California Invasive Plant Council
CDFA	California Department of Food and Agriculture
CEC	California Energy Commission
CNPS	California Native Plant Society
COC	Conditions of Certification
EA	Environmental Assessment
ECM	Environmental Compliance Manager
EPA	U.S. Environmental Protection Agency
°F	Fahrenheit
gen-tie	generation tie
GIS	Geographic Information System
GPS	Global Positioning System
HTF	heat transfer fluid
IWVWD	Indian Wells Valley Water District
kV	kilovolt
mph	miles per hour
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
PAR	Pesticide Application Record
PUP	Pesticide Use Proposal
Project	Ridgecrest Solar Power Project
Progress Reports	Long Term Weed Control Progress Reports
ROW	right of way
SCA	solar collector assembly
SCE	Southern California Edison
WCA	Weed Control Area
WMP	Weed Management Plan

I. INTRODUCTION

A. Plan Purpose

This Draft Weed Management Plan (WMP) includes measures to fulfill the conditions of certification (COCs) identified in the Application for Certification (AFC) submitted to the California Energy Commission (CEC) for the Ridgecrest Solar Power Project (RSPP or Project). The COCs include development of a noxious weed control plan to provide (1) monitoring, preventative, and management strategies for weed control during construction and operation of the Project; (2) control and management of noxious weeds in areas temporarily disturbed during construction; (3) a long-term strategy for noxious weed control and management during the operational phase of the Project; and (4) a noxious weed control program for the decommissioning phase.

The purpose of this WMP is to prescribe methods to monitor for, prevent the introduction of, and control the spread of noxious weeds on site prior to, during and subsequent to maintenance and construction activities. The WMP is intended to prevent resource degradation on site caused by noxious weeds and ultimately prevent a net increase in the percentage of the Project infested with weeds. Ridgecrest Solar I, LLC (the Applicant) acknowledges that construction may promote the introduction and spread of noxious weeds on public lands and, therefore, will be responsible for carrying out the methods described in this WMP. The Project boundaries are shown in Figure DR-BIO-69-1 and Figure DR-BIO-69-2. This document was prepared following guidance from other documents, including Bureau of Land Management (BLM) Manual 9015 Integrated Weed Management (BLM 2009a), BLM Weed Prevention and Management Guidelines (BLM 2009b), BLM's Integrated Weed Management Plan and Environmental Assessment for the Bureau of Land Management Ridgecrest Field Office (EA Number CA-650-2005-108) (Harris, 2005), and the Weed Management Plan prepared for the proposed Ivanpah Solar Electric Generating System (SEGS) project. The BLM is currently updating EA Number CA-650-2005-108 and this WMP will be updated as needed to comply with the final version.

B. Goals and Objectives

The goal of this WMP is to provide guidance on the implementation of early detection protocols, define containment strategies, and describe control methods to prevent the introduction and minimize the spread of noxious weeds during maintenance and construction activities. Noxious weeds are opportunistic plants that readily colonize disturbed areas and adversely affect the habitats they invade. Their introduction and spread often results in adverse effects to the environment and may also result in economic impacts. These plant species are able to exclude or out-compete desired native species and their introduction and spread may result in a decrease in overall species diversity. It is important to specify the objectives of a weed management program before Project inception. These objectives need to be consistent with existing and proposed future site conditions, the specific biology of the identified weed species, and environmental context of the Project.

Weed management objectives for the site include the following:

Prevention: Prevent the introduction of invasive weeds to the Project by implementing sound construction and site management strategies.

Monitoring: Monitor the site on a regular basis to ensure early detection and treatment of incipient populations of weeds that may be new to the site and/or area and new populations of weeds already present that may be spreading into new areas.

Eradication: Eliminate all individuals of a particular species within a specified area. This will be the goal for most noxious weed species on the site, and is appropriate where a weed is of considerable economic and environmental concern and the population size is manageable. This method is also important to eliminate incipient populations before they can become problematic.

Suppression: Reduce current infestation density, but not necessarily reduce the total area occupied by the infestation. Suppression is warranted for many widely distributed, high-density weeds where complete eradication is not feasible.

Containment: Prevent infestation expansion and spread, with or without any attempt to reduce infestation density. Containment focuses on halting spread until suppression or eradication can be implemented, and is practical only to the extent that the spread of seeds or vegetative propagules can be prevented.

Noxious Weed Definition

Various regulatory agencies maintain definitions of "noxious weeds" and how they affect the environment. The California Department of Food and Agriculture (CDFA) Code Section 5004 maintains the most relevant definition to this WMP and defines noxious weeds as, "any species of plant which is, or is liable to be, detrimental or destructive and difficult to control or eradicate" (CDFA 2009). Noxious weeds are typically characterized as non-native plants that aggressively colonize new areas and can grow to dominate native plant communities, if uncontrolled. Noxious weeds could out-compete native vegetation, alter physical or chemical soil conditions, and dominate the landscape to the detriment of native plants and wildlife. Noxious weeds are often quick to colonize disturbed areas, including construction sites, roadsides, irrigated sites, or any other area with altered hydrology, soil structure, or soil chemistry. Due to the climate conditions at the Ridgecrest site, which is characterized by cold winters and a lack of summer moisture, there are relatively few noxious weeds that present problems to range management in the area that the Ridgecrest Field Office manages (Harris, personal communication).

C. Management Roles

The Applicant is ultimately responsible for implementing this WMP. It is anticipated that the Applicant's contractors and other designees responsible for implementing components of this WMP will be subject to the following:

Contractor(s): Contractual language will be included in all construction documents and ongoing maintenance contracts to ensure that all contractors, subcontractors, vendors, maintenance personnel and other parties who perform either construction or ongoing maintenance or repairs at the site abide by and implement the provisions of this WMP. Implementing the construction provisions of this WMP will be a part of construction contracts. Landscape contractors and other specialists will implement specific provisions of this WMP either as subcontractors to the general construction contractor, or through independent contracts with the Applicant.

Construction Manager: The construction manager will have ultimate oversight of the construction contractor to ensure compliance with the provisions of this WMP.

Environmental Compliance Manager: The Applicant will designate an Environmental Compliance Manager (ECM) to provide oversight of construction practices and ensure compliance with the provisions of this WMP. The ECM (including support staff as needed) will be contracted directly by the Applicant and coordinate with the construction manager to ensure contractor compliance with environmental requirements for construction.

Bureau of Land Management: As the administering land management agency, BLM will provide ultimate approval of the contents of this WMP, and compliance oversight of its provisions. BLM will provide timely review of work products including this WMP, modifications or amendments to this WMP, and subsequent reports as required by this WMP.

II. NOXIOUS WEED INVENTORY AND BASELINE CONDITIONS

A list of noxious weeds of concern within the Project area, and therefore discussed in detail in this WMP, was compiled based on a review of a list of noxious weeds ranked by CDFA (CDFA 2007), the California Invasive Plant Council (Cal-IPC) (Cal-IPC 2009), and the U.S. Department of Agriculture (USDA) California list (USDA 2009), as well as those weeds of special concern identified by BLM. In addition, AECOM contacted the BLM Natural Resources Specialist responsible for invasive weed control in the Ridgecrest Field Office to discuss weeds of particular concern in the project area. The main concern expressed was communication with the BLM before chemical treatments occur, as the BLM will need to go through an environmental review process in compliance with The *Final Environmental Impact Statement on Vegetation Treatment on BLM Lands in Seventeen Western States* (USDI 2007). The Natural Resources specialist also stated that relatively few noxious weed problems exist in the area managed by the Field Office.

Weeds currently present at the Project were determined based on a floristic inventory of the Biological Resources Study Area (BRSA) conducted from February to May 2009 during general botanical and special-status plant surveys. Non-native invasive species observed and their ratings are provided in Table DR-BIO-69-1. While these weeds were noted present within the BRSA, their exact locations and extents within the BRSA are not known. A map showing location and extent of noxious weeds and other invasive nonnative plants described in the Project's AFC (AECOM 2009a) will be created during spring and fall special-status plant surveys planned for 2010 and in coordination with the BLM natural resources specialist.

Table DR-BIO-69-1
Non-Native Invasive Species Observed within Biological Resources Study Area

Scientific Name	Common Name	CDFA Rank*	Cal-IPC Rating*	USDA CA Rating*
Bromus madritensis spp. *madritensis*	red brome	-	High	-
Bromus tectorum	cheat grass	-	High	-
Chenopodium murale	nettleleaf goosefoot	-	-	-
Erodium cicutarium	redstem stork's bill	-	Limited	-
Salsoa tragus	Russian thistle	C	Limited	CW
Schismus sp.	Mediterranean grass	-	Limited	-

*** Ranks/Ratings**

CDFA

- C – Generally widespread throughout the state. Action to retard spread outside of nurseries at the discretion of the commissioner. Reject only when found in a crop seed for planting or at the discretion of the commissioner.

Cal-IPC

- High – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
- Limited – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

USDA CA

- CW – C list (noxious weeds)

Source: AECOM 2009b. Ridgecrest Solar Power Project Botanical Survey Report, Kern County, California. Prepared for Ridgecrest Solar I, LLC. Berkeley, CA. September.

Of the species listed in Table DR-BIO-69-1, only Russian thistle would meet the definition of noxious weed used in the Ridgecrest Field Office. The distribution of Russian thistle in the Ridgecrest area is mainly limited to roadsides and other disturbed sites and the BLM manages its distribution on an as needed basis such as near facilities.

Mediterranean grass (*Schismus*) is widely spread in the Project area, but is not managed by the BLM because it is considered naturalized and considered to fulfill a function in the ecosystem.

None of the other species included in Table DR-BIO-69-1 are currently actively managed or controlled by Field Office programs other than at very localized locations where they could present a fire hazard, such as dense stands of annual grasses next to buildings or facilities (Harris personal communication). These species will be managed on an as needed basis and in consultation with the BLM Ridgecrest Field Office.

A. Field Surveys

An initial botanical field assessment and focused special-status plant survey of the Project were conducted in support of the AFC (AECOM 2009a) from February to May 2009. Invasive species on the Cal-IPC List: High, Moderate, and Limited (Cal-IPC 2009) were noted when occurring in high concentrations (107.64 square feet) and nearly monotypic stands (AECOM 2009b). No non-native invasive weed species at these densities were noted during surveys in 2009. This observation was confirmed by the BLM natural resources specialist (Harris personal communication).

Reconnaissance level surveys of the portion of the proposed water pipeline that was not covered in the spring 2009 surveys were conducted in fall 2009 (AECOM 2009c). These surveys focused on assessing habitat types to determine potential habitat for special-status species and helped plan 2010 surveys and did not focus on non-native invasive weeds.

Non-native invasive species known to occur onsite are listed in Table DR-BIO-69-1. Additional weeds of concern that are known to occur in the Project vicinity and could be of concern to the Project are listed in Attachment DR-BIO-69-A, along with their Cal-IPC, CDFA and USDA ratings.

B. Preconstruction Survey and Treatment

To prevent adverse effects from noxious weeds resulting from Project implementation, the Applicant will designate a qualified biologist with experience in noxious weed inventory and mapping (herein referred to as an Authorized Biologist) who will survey the site and adjacent buffer for noxious weeds prior to the start of construction. For efficiency, the mapping may be completed in conjunction with other surveys, such as special-status plant surveys that are floristic in nature and cover the entire Project disturbance area. All populations of noxious weeds encountered will be mapped using a Global Positioning System (GPS), and data on the species, location, extent and threat for further spread will be recorded. The data collected will then be evaluated to determine whether pre-construction treatment is necessary and what type of treatment is recommended. This determination will happen in coordination with the BLM natural resources specialist. If preconstruction treatment is necessary, populations will be flagged prior to construction and will be treated according to methods approved in the final WMP.

III. WEED MANAGEMENT AREA/WEED CONTROL AREAS

The Weed Management Area for the Project will include all proposed Project facilities including a 100-foot buffer around the perimeter, the transmission line corridor, a 100-foot buffer on either side of the transmission corridor, and all access roads, including a 25-foot buffer on either side of the roads. Within the Weed Management Area, specific Weed Control Areas (WCAs) will be designated on an as needed basis. Different areas are expected to require specific management considerations depending on a range of factors.

A. Temporary Disturbance Areas

Linear Project features include the new transmission line right-of-way (ROW), the relocated transmission lines, and a water pipeline. Construction staging areas and temporary access roads are also included. In most cases, disturbance at these facilities will be temporary. Transmission line construction will involve some temporary disturbance along with permanent tower placement and an access road for maintenance.

Soil disturbance during construction and temporary use will create habitat well suited to disturbance-adapted invasive weed species. Therefore, measures to minimize the potential for weed introduction by personnel and equipment will be needed. Areas temporarily disturbed will continue to be prone to weed invasion and establishment, and ongoing monitoring and management will be required. Potential areas meeting these criteria are described below. Weed management measures for these areas, including monitoring frequency, target weed species, and control methods are included in this WMP.

Fuel Supply

An auxiliary boiler and heat transfer fluid (HTF) heater will be fueled by propane. Propane will be delivered to the site via truck from a local distributor and stored in an 18,000-gallon above-ground tank. Since the tank and associated fuel distribution pipelines will be constructed within the existing disturbance area, it is not anticipated that additional weed control measures will be required.

Water Supply

Groundwater, provided through the Indian Wells Valley Water District (IWVWD), will be used to supply domestic and industrial water needs (AECOM 2009a). A new 12-inch diameter, approximately five-mile long water pipeline will be installed entirely within public road ROWs. Regular weed monitoring and management during construction will be required. Some areas temporarily disturbed during construction will require weed management.

Transmission Lines and Relocations

The Project will be connected to the Southern California Edison (SCE) transmission system by constructing a new single-circuit three-phase 230 kilovolt (kV) transmission line from the turbine generator that would interconnect to a new nearby switchyard owned by the Applicant. The

transmission line would be approximately 0.75 miles long and located within the disturbance area. Therefore, it is not anticipated that additional weed control measures will be required beyond what is proposed for the disturbance area. However, ongoing vehicle access for construction and regular operations will occur along the new transmission line. This has the potential for ongoing introduction of non-native invasive weed species through soil disturbance and equipment entrance, with ongoing weed management requirements.

Plant site construction will require the relocation of approximately 1.6 miles of existing overhead 115-kV and 230-kV SCE transmission lines that currently traverse the southwestern portion of the Project site. A linear corridor within the Project's ROW but outside the plant fence line, is reserved for the relocated transmission lines. It is anticipated that this corridor will be assigned to SCE as part of the transmission line relocation process. Since the relocated lines will be located within the disturbance area, it is not anticipated that additional weed control measures will be required.

Staging and Laydown Areas

Portions of the main Project site will serve for storing pipe and other construction materials. Although most portions will be permanently developed, any remaining portions will be restored, with the same weed monitoring and management requirements of other temporary disturbance areas.

B. Permanently Developed Areas

The areas described in this section would be permanently developed, but could support weedy species along peripheral disturbed areas and function as seed reservoirs to adjacent natural habitats if not properly managed.

Project facilities include the following:

- Northern and southern solar fields;
- Power block;
- Access road from Brown Road to on-site office;
- Office and parking;
- LTU for bioremediation/land farming of HTF-contaminated soil;
- Warehouse/maintenance building and laydown area;
- On-site transmission facilities, including central internal switchyard; and
- Dry wash rerouting.

Solar Collector Assembly Support Structures

Each solar collector assembly (SCA) will be supported by structures (stands) that connect the parabolic troughs to the drive mechanism. Each array will be supported by multiple individual foundations with a foundation located approximately every 63 feet along the assembly. Foundation design will be based on site-specific geotechnical conditions to ensure that the SCA stands are able to support all loading conditions (including wind loading) at the Project site (AECOM 2009a).

Soil disturbance during construction will create habitat well suited to disturbance-adapted non-native invasive species, and the continual use of the area by personnel and heavy equipment has the potential to introduce additional propagules of these species. The area will require ongoing monitoring and maintenance during construction and all equipment will require cleaning at wash stations as specified below. During operations, equipment and personnel will continue to access the area for heliostat cleaning and other maintenance. Wash water overflow from the ongoing cleaning of heliostat mirrors will provide a water source that would potentially lead to noxious weed establishment and growth. These areas will require continual weed management, and application of pre-emergent herbicides will be implemented to inhibit weed germination and establishment.

Landscaped Areas

Landscaped areas may be established at the administrative building, entrance gate, and at a limited number of other visually prominent locations. Because there may be irrigation application, which could contribute to noxious weed germination or establishment, ongoing weed control would be anticipated.

Roads

Roadsides and the medians of unpaved service tracks are vulnerable to weed invasion. Roads often alter local hydrology; are subject to initial and ongoing disturbance during construction, maintenance, and use; provide topographic variation that could capture wind or waterborne seed; and may be subject to seed distribution from passing vehicles. Ongoing weed management will target roadside weeds during the operational phase of the Project.

Other Permanent Facilities

Additional areas where conditions are suitable for noxious weed establishment may be present. These may include areas where soils have been cleared of their natural vegetative cover, compacted, or otherwise disturbed; areas where hydrology is altered from its natural conditions, such as due to increased surface flow from adjacent developed areas; or areas with continued vehicle or foot traffic. Ongoing weed management will include monitoring and treatment of these areas on as needed basis.

C. Linear Facilities

Project related linear facilities located outside the Project fence line include a portion of the 12-inch diameter, approximately five-mile long water pipeline, the relocated SCE transmission lines, and the 600-foot long access road from Brown Road to the south solar field. Regular weed monitoring and management during construction will be required. Some areas temporarily disturbed during construction will require weed management.

IV. WEED RISK ASSESSMENT

Consistent with BLM guidelines for weed management, the Applicant will conduct a weed risk assessment for each component of the Project, including construction, operation and closure; all of which will involve soil disturbing activities or the alteration of vegetation. BLM's stepwise risk assessment is available online at: http://blm.gov/ca/st/en/prog/weeds/9015.html and is summarized below.

A. Risk Assessment Process

The primary focus of a risk assessment is on each ground disturbing or site-altering project authorized, funded, or conducted on BLM lands. The Risk Assessment Process must be accomplished by, or closely supervised by, a biologist who has a good understanding of noxious weed ecology. The Risk Assessment Process, per guidelines provided in BLM Manual 9015 Integrated Weed Management (BLM 2009a), is described below.

Pre-Field Review

Review existing information for the subject area.

1. Check local BLM, State/County weed board, and Natural Heritage or Data Conservation Center records to determine if noxious weed species have been sighted in or adjacent to the area. Develop a list of species considered for possible occurrence.
2. Compare the habitat requirements of noxious weed species with habitat known to occur in the area to determine if potential habitat for noxious weed species exists.
3. Determine if a field reconnaissance is needed using the following:
    a. If no noxious weeds are likely to occur within the area, document the results and proceed with the project as planned.
    b. If the presence of noxious weed species or their habitats are within or adjacent to the area is indicated by the pre-field review, conduct a field reconnaissance.
4. Summarize the results, including a list of species considered and any sources of area habitat information. File in the Risk Assessment Report and appropriate National Environmental Policy Act (NEPA) document.

Note: Steps 1 through 3 were completed during preparation of this Draft WMP.

Field Reconnaissance

Use a sampling design in the field reconnaissance sufficient to reliably show that likely areas of noxious weed occurrence were searched at the proper time of year for identification of noxious weed species. Field reconnaissance also includes inspection of potential sawmills, gravel pits, equipment yards, or other areas for the presence of noxious weed species that could be transported onto BLM lands. Take the following actions as necessary as a result of the reconnaissance:

Presence of Class A or B Weeds (CDFA Rank): If class A or B weeds are present:

- Develop and implement management measures to control weeds.
- Install a monitoring system for a minimum of 5 years.
- Determine the risk of introducing noxious weeds.

Presence of Class C Weeds (CDFA Rank): If class C weeds are present:

- Develop and implement management measures to prevent spread of noxious weeds.
- Install a monitoring system for a minimum of 3 years.
- Determine the risk of introducing noxious weeds.

Presence of No Weeds: If no weeds are present or likely to occur:

- Document the results.
- Proceed with the project as planned.

File the Risk Assessment Report and the appropriate NEPA document. Include a list of species for which a reconnaissance was conducted, a description of the survey design, and a narrative of the habitat information developed in the pre-field review. Report all sightings of noxious weed species to the appropriate interested and affected parties including county and/or State agencies, other Federal agencies, and monitoring and oversight groups.

Note: General botanical and special-status plant surveys conducted in 2009 yielded much of the required information and a preliminary list of weed species of concern is included in this WMP. This data will be supplemented with field data to be collected in 2010 and a Risk Assessment Report will be completed at that time.

Risk Determination

The Risk Assessment Report should be used in determining the risk rating of introducing noxious weeds in the area. Document the results, including planned preventative, management, control, and monitoring measures. Include a list of species considered for possible occurrence and any sources of area habitat information and supporting material from the pre-field and field reconnaissance. Summarize the results and file in the Risk Assessment Report and the appropriate document.

Note: To the extent available, this data is included in this Draft WMP and will be updated upon completion of the 2010 field inventory.

Use a Risk rating to describe the relative risk of the potential for noxious weed establishment in the Project area and to serve as a guide for further action regarding project modification or implementation. Calculate the risk rating as follows:

- Risk Rating = Likelihood x Consequence
  - Likelihood = the likelihood that noxious weed species will become established in the Project area.
  - Consequence = the consequence of noxious weed species become established in the Project area.
- Factors. Use the factors in developing the Risk Rating. The factors are:
  - Factor 1: Likelihood of noxious weed species spreading to Project area.
  - Factor 2: Consequence of noxious weed establishment in Project area.

The risk or likelihood and consequence of noxious weeds range from a value of 0 (none) to 100 (high). See below for value ratings and procedural steps for determining the risk rating and monitoring requirements.

Note: This step will be implemented upon completion of the 2010 field inventory.

B. Risk Assessment Factors

Factor 1: Likelihood of Noxious Weed Species Spreading to the Project Area.

- None: Noxious weed species not located within or adjacent to the Project area. Project activity is not likely to result in the establishment of noxious weed species in the Project area.
- Low: Noxious weed species present in areas adjacent to but not within the Project area. Project activities can be implemented and prevent the spread of noxious weeds into the Project area.
- Moderate: Noxious weed species located immediately adjacent to or within the Project area. Project activities are likely to result in some areas becoming infested with noxious weed species even when preventative management actions are followed. Control measures are essential to prevent the spread of noxious weeds within the Project area.
- High: Heavy infestations of noxious weeds are located within or immediately adjacent to the Project area. Project activities, even with preventative management actions, are likely to result in the establishment and spread of noxious weeds on disturbed sites throughout much of the Project area.

Factor 2: Consequence of Noxious Weed Establishment in Project Area.

- Low to Nonexistent (1): None. No cumulative effects expected.
- Moderate (5): Possible adverse effects on site and possible expansion of infestation within Project area. Cumulative effects on native plant community are likely but limited.
- High (10): Obvious adverse effects within the Project area and probably expansion of noxious weed infestations to areas outside the Project area. Adverse cumulative effects on native plant community are probably.

Note: This step will be implemented upon completion of the 2010 field inventory.

C. Risk Rating Factors

Step 1: Identify level of likelihood and consequence of adverse effects and assign values according to the following:

- None – 0
- Low – 1
- Moderate – 5
- High – 10

Step 2: Multiply level of likelihood by consequence.

Step 3: Use the value resulting in Step 2 to determine Risk Rating and Action as follows:

- None (0): Proceed as planned.
- Low (1-10): Proceed as planned. Initiate control treatment on noxious weed populations that get established in the area.
- Moderate (25): Develop preventative management measures for the Project to reduce the risk of introduction or spread of noxious weeds in the area. Preventative management measures should include modifying the Project to include seeding the area to occupy disturbed sites with desirable species. Monitor area for at least 3 consecutive years and provide for control of newly established populations of noxious weeds and follow-up treatment for previously treated infestations.
- High (50–100): Project must be modified to reduce risk level through preventative management measures including seeding with desirable species to occupy disturbed sites and controlling existing infestations of noxious weeds prior to Project activity. Project must provide at least 5 consecutive years of monitoring. Project must also provide for control of newly established populations of noxious weeds and follow-up treatment for previously treated infestations.

Note: This step will be implemented upon completion of the 2010 field inventory.

V. MONITORING AND SURVEY METHODOLOGY

A. Weed Identification

Monitoring and removal of weeds requires skill and training in plant identification. Training in plant identification and field manuals with photographs of native desert plants and of common weeds will be provided to all field staff including biological monitors, weed abatement contractors, plant operators and staff, and construction workers.

- The University of California digital library at http://www.calflora.org/ contains species information and an extensive photo collection.
- The Cal-IPC website at http://www.cal-ipc.org. This website contains an invasive plant database, plant profiles, and extensive other information on invasive plants and control.
- The USDA National Invasive Species Information Center at http://www.invasivespeciesin fo.gov/. This website has information on invasive species and links to the extensive USDA PLANTS database (http://plants.usda.gov/), with species profiles and photographs.
- The California Native Plant Society (CNPS) maintains information including a database on California vegetation including rare, threatened, and endangered plants (http://www.cnps.org/).
- BLM also maintains a website with useful information on noxious weeds, including management strategies for weeds in California (http://www.blm.gov/weeds/).
- The Center for Invasive Plant Management maintains a website with useful information and resources, including plant profiles, and can be accessed at http://www.weedcenter.org/.
- The Mojave Weed Management Area maintains a website with profiles of problem weeds in the Mojave Desert and management options (http://www.mojavewma.org/index/php.)
- *Weeds of the West* by Tom D. Whitson is a valuable resource and available at many online book suppliers. This source is currently used in the Ridgecrest Field Office.

B. Survey and Monitoring Methodology

Surveys and monitoring will ensure timely detection and prompt eradication of weed infestations, which are essential to a long-term strategy for weed management. The methods outlined below refer to surveying and monitoring during construction and operation. For preconstruction surveys and treatment, please refer to Section II.A above.

Construction Areas

The ECM will oversee biological monitors who will be present during site clearing and construction activities. Biological monitors will be responsible for inspecting all construction areas, identifying the presence of noxious weeds, and inspecting equipment cleaning facilities for weed seed removal. The ECM will be responsible for prescribing management activities consistent with this plan when weeds become established. Monitoring of all construction areas will be conducted daily, including access routes, and will consist of walking or driving slowly over construction areas and observing for seedlings of exotic species. This will continue on a daily basis until ground-disturbing construction activities are completed. Semi-monthly monitoring will continue thereafter.

General Operations and Monitoring

General site monitoring of the operating facility will be conducted by grounds personnel on an ongoing basis. Weed control will be conducted, as needed, by grounds personnel, at a minimum of every other week during the growing season (March through August), and once a month otherwise. Grounds personnel will be trained to identify non-native invasive weed species and native vegetation.

Known Infestation Areas

Where weed infestation occurs, and treatment is implemented, the area will be targeted for ongoing monitoring to ensure that treatments are effective and that complete eradication or the desired level of control has been achieved. Visits to known infestation areas will continue until noxious weeds in the area are controlled.

Database and Mapping

Weed mapping is an important tool in effective weed management programs. Map inventories of noxious weeds can provide useful information on the species present and the extent of the infestations. They can also serve as the basis for monitoring programs. The information may be used to set priorities for which weed species to treat first and what specific infestations to target. Weed surveys will be conducted annually at the time of year when target weed species would be present and identifiable. Casual observances made by field personnel will also be recorded and tracked, as appropriate. Field personnel will be trained to identify weeds of concern.

A noxious weeds database with data on species, detection date, growth stage, infestation extent, treatments implemented, results of treatment, and current status will be maintained during the construction and operation phase of the Project. A geographic information system (GIS) will be used to map and store data. The priority of infestation areas to be treated will be established based on species, vulnerability of the site to invasion, growth stage, and effectiveness of treatment. Also included will be areas mapped as vulnerable to weed invasions. Vulnerability will be assessed on the following: (1) availability of weed propagule sources, such as along roadsides or near soil stockpiles:(2) areas disturbed, such as through land clearing and earthwork; or (3) areas near known prior or treated weed infestations or existing infestations that are out of the managed area.

VI. WEED MANAGEMENT GUIDELINES

A. Species Descriptions and Management Strategy

Descriptions of the more common or troublesome noxious weeds occurring or potentially occurring at the site are provided in this section, along with the basic weed management strategy applicable to each. Attachment DR-BIO-69-A provides a complete list of the weed species of concern in this area, and Table DR-BIO-69-2 (Harris 2005) provides additional information on management strategy and control methods for all observed and potentially occurring noxious weed species. Management strategies must encompass not only eradication, but also identify the means of eradication and the plant species to be eradicated.

The following list provides brief descriptions of the weed species of particular concern at the site:

- Russian thistle (*Salsola tragus*): This species is know from the project area, was observed on site, and is actively managed by BLM as necessary. It will be eradicated form the project site in consultation with the BLM Ridgecrest Field Office.

New Weeds

Weeds not identified above or included in Table DR-BIO-69-1, or previously reported for the area or anticipated, could colonize the Project or invade facilities, both during construction and operation. During construction, the ECM will be required to regularly update the list of potentially noxious weeds, and identify any new potential threats. This will include developing a management strategy and management methods appropriate to the plant species and the nature of any potential invasion. Similarly, the facility plant manager or appropriate designee during operations will be required to continually update the potential noxious weed list and provide monitoring and management appropriate to any new species.

B. Preventative Measures

Prevention is the first measure that will be implemented to manage the spread of non-native invasive species. A variety of techniques have proven effective for managing existing occurrences of non-native invasive species, including mechanical, biological, and chemical methods. The most appropriate management action will be chosen based on the weed species, the physical characteristics of the Project, and economic and social considerations. Monitoring and rapid implementation of control measures will be performed to ensure early detection and eradication for weed invasions.

General measures which may be implemented to prevent the spread of weed propagules and inhibit their establishment on the Project include the following:

- Conducting pre-construction surveys and treating potential sources on or near the Project prior to ground disturbance.

- Limiting disturbance areas during construction to the minimal area required to perform work and limiting ingress and egress to designated routes.
- Maintaining vehicle wash and inspection stations and closely monitoring the types of materials brought onto the Project to minimize the potential for weed introduction.
- Educating workers about invasive weeds potentially problematic at the Project and enlisting their help in preventing their introduction and spread.
- Reestablishing vegetation as quickly as practicable on disturbed sites as the most effective long-term strategy to avoid weed invasions.

Some guidelines for preventing weeds from entering public lands and spreading to new un-infested areas are listed below (BLM 2009b).

- Preventing introduction through contaminated seed, feed, mulch, gravel or fill;
- Preventing introduction through movement of animals, people or machinery;
- Preventing introduction through minimizing disturbance; and
- Preventing introduction through proper planning. All of these methods have been considered during preparation of this Draft WMP and will be implemented during construction, operation and decommissioning of the project.

Construction

Worker Environmental Training

Noxious weed management will be incorporated as a part of mandatory Project environmental training for all contractors or related personnel entering the Project during construction. This will include all contractors, subcontractors, inspection personnel, construction managers, construction personnel, and individuals bringing vehicles or equipment onto the Project. Training will include instruction on weed identification and a training module on the impacts of noxious weeds on agriculture, livestock, wildlife, and fire hazard. Impacts of noxious weeds on native vegetation, wildlife, and fire activity will be discussed including an explanation of how invasive grasses provide a fine fuel understory which can spread fire from shrub to shrub and how this has historically been absent in the native desert ecosystem. The measures to prevent the spread of noxious weeds in areas currently un-infested, and controls on their proliferation when already present, will also be explained.

Wash Stations

To prevent the spread of weed species into new habitats, wash stations will be set up in staging areas to remove any dirt or mud that could be attached to construction vehicles and contain weed seeds. Wash station locations will be determined during final design, but will be located at ingress points to construction areas. Vehicles entering from offsite locations will be required to stop for cleaning. Heavy equipment entering the Project on trailers will also be required to be washed prior to being operated onsite. The Contractor, with ECM oversight, will ensure that

vehicles and equipment are free of soil and debris capable of transporting noxious weed seeds, roots, or rhizomes before the vehicles and equipment are allowed to use access roads. Vehicles will be reasonably dry before leaving the wash station. Some noxious weeds, such as Sahara mustard require water for the scarification process and therefore vehicles leaving the station wet could promote recruitment of species of specific concern to the BLM, such as Sahara mustard.

Wash stations will be located away from sensitive biological resources, and will be constructed with either a concrete wash pad, or a completely cleared and compacted soil or gravel pad. Silt fencing, weed-free certified hay bales, or other means of trapping wash water sediment and seeds will be installed around the perimeter of wash stations.

Vehicles will be washed with high-pressure water equipment before entering the Project area. The wash down will concentrate on tracks, feet, or tires and on the undercarriage, with special emphasis on axles, frame, cross members, motor mounts, and on and underneath steps, running boards, and front bumper/brush guard assemblies. Vehicles or heavy equipment will be required to remove all caked on mud and debris before entering the Project area. Vehicle cabs will be swept out and refuse will be disposed of in waste receptacles. Sediment accumulated from washing will be shoveled out daily and placed in a sealed container for disposal in an approved landfill. If removal requirements exceed the capability of the wash stations, equipment will be washed elsewhere before being allowed on the Project.

Project workers will also inspect, remove, and dispose of weed seed and plant parts found on their clothing and personal equipment. The product will be bagged and disposed of in a dumpster for deposit in local landfills. When vehicles and equipment are washed, a log will be kept stating the location, date and time, serial number and type of equipment, and methods used. The crewmember that washed the vehicle will sign the log. Written logs will be included in the monitoring reports.

Infestation Containment and Control

During construction, areas of concern will be identified and flagged in the field by biological monitors. The flagging will alert construction personnel that weeds are present and will prevent access into these areas until noxious weed management control measures have been implemented. Contractors will avoid or minimize all types of travel through weed-infested areas. Immediate control measures will be implemented as described in the sections below.

The Contractor will begin Project operations in weed-free areas whenever feasible before operating in weed-infested areas, until the ECM has verified completion of weed treatments within weed-infested areas.

Site Soil Management

The Contractor will limit the size of any vegetation and/or ground disturbance to the absolute minimum necessary to perform the activity safely and as designed. The Contractor will also avoid creating soil conditions that promote weed germination and establishment as practicable.

Soil conditions that promote weed germination and establishment include soil excavation/disturbance, vegetation removal, soil compaction, loss or removal of topsoil, introduction of any chemical compounds, including fertilizer, and soil stockpiling.

In areas where infestations are identified, the Contractor will stockpile cleared vegetation and salvaged topsoil adjacent to the area from which they are stripped to eliminate the transport of soil-borne noxious weed seeds, roots, or rhizomes. During reclamation, the Contractor will return topsoil and vegetative material from infestation sites to the areas from which they were stripped.

Weed-Free Products

The Contractor will ensure that straw or hay bales used for sediment barrier installations are obtained from certified sources that are free of primary noxious weeds. Additional products such as gravel, mulch, and soil, may also carry weeds. Such products will be obtained from suppliers who can provide weed-free certified materials. Where feasible, mulch will be generated from native vegetation cleared from the Project itself. Soil will not be imported onto the Project.

Weed-Free Seed

If seed is purchased from commercial vendors for Project restoration activities it will be labeled in compliance with the relevant provisions of the CDFA Code. In addition to having the correct label, the seed will be required to be free of noxious weeds and the label should so state. Preferably, seed should be collected as a part of the restoration contract from adjacent areas, which provides the additional benefit of ensuring local genetic stock. No special-status plant species were detected within the BRSA during 2009 surveys. However, if special-status plant species are found during future surveys, to mitigate for potential loss of special-status plant species, seed from target species will be collected from onsite sources (AECOM 2009a).

Operations

Facility Staff Training

Noxious weed management will be incorporated as a part of mandatory training for groundskeepers and maintenance personnel. Training will include weed identification and the impacts on agriculture, livestock, wildlife, and fire frequencies. The importance of preventing the spread of noxious weeds in areas currently un-infested, and controlling the proliferation of weeds already present, will also be explained.

Infestation Containment and Control

During operations, areas of concern will be identified and flagged in the field by grounds keepers. The flagging will alert personnel that weeds are present and will prevent access into these areas until noxious weed management control measures have been implemented. Immediate control measures will be implemented as described below.

Early Detection and Rapid Response

The best time to eradicate noxious weeds is before they get established in an area. Early detection of newly introduced weeds is the best way to prevent establishment. These early detection and eradication efforts should be likened to fire control: early spotted fires are quickly extinguished before they can spread. Early detection programs will include:

- **Weed Identification and Training Sessions** - These will be offered for field employees and will utilize information obtained from local Agricultural Commissioners, Cooperative Extension agents, and other knowledgeable individuals. Suitable weed identification handbooks will also be provided.
- **Weed Location Mapping** - A map of the area will be located in all Field Offices for the field employees to document observations of noxious weeds. Documented sites will be verified by a qualified professional. Encouragement and incentives will be offered to staff members and others who participate in identification and reporting of noxious weeds. Once new infestations are verified, quick response is required in order to eliminate the weed before it spreads. For those areas with ongoing control efforts, locations will be entered into GIS.
- **Determination of High Priority Areas** - Certain areas may be more vulnerable to disturbance and weed invasion, and will be considered high priority areas. These areas will be clearly marked on all weed maps and will be inventoried whenever possible. Cooperate with adjacent landowners and other agencies in order to coordinate early detection efforts around high priority areas.

Project Closure

Control of noxious weed establishment will be a central goal of the Conceptual Decommissioning Plan, which will be provided at a later date.

C. Eradication and Control Methods

Management strategies must encompass not only eradication, but also identify the means of eradication and the plant species to be eradicated. Eradication is usually only feasible for small populations of high priority species due to the large amount of resources required for this level of control. Weed infestations are typically targeted to a level of control that is located somewhere between eradication and elimination of seed production (Gershman & Lane 2000).

Table DR-BIO-69-2 shows summary of proposed control methods.

Table DR-BIO-69-2 Summary of Proposed Control Techniques

Technique	Notes
Cut Stump (Chemical)	Effective on all plants over 3/8” diameter
Foliar spray(Chemical)	For dense stands of small plants
Wipe Method (Chemical)	For dense stands of small plants and regrowth on perennial plants: Similar to foliar spray, but more selective as only target plants aerial parts hit.
Weed Wrench™ or Root Jack™	Works on plants up to 3” with larger version. Will pull up soil on larger plants
Hoe and shovel	May require bagging and removing complete plant with seeds.
Hand Pull	Only works on small <3/8” salt cedar in moist soil

Unacceptable Weed Removal Methods

Tilling

Tilling, or the turning over of soil, is a weed-control practice used on agricultural lands that may be appropriate for agriculture. However, this method is ineffective and inappropriate in desert landscapes, and will not be attempted. Within desert landscapes, tilled weeds are likely to set seed, even after burial. In addition, tilling is likely to disturb native cover stock, and will also disrupt the natural structure and chemistry of the soil, allowing weed seeds to proliferate from soil disturbance. Fragmenting weeds resulting from tilling will also lead to more widespread growth of non-native plants.

Mowing

Mowing is sometimes used to reduce weed cover and thatch late in the growing season, typically after annuals have matured. This method does not remove weeds; it merely cuts back the thatch that develops during the growing season. It is sometimes used as a fire control method, but will result in proliferation of weed seed and aggravation of weed infestation problems. Mowing is problematic for the following reasons: (1) Mowing would severely damage existing native plants, including small individuals that might or might not be visible at the time of mowing, but could be pushing their way through the canopy as they mature; (2) Mowing, which is typically done late in the spring or early summer, would result in maturation of weed seed from existing weeds after they are cut and left to desiccate, increasing weed seed in the seedbank and ensuring a robust crop of weeds in subsequent years; and (3) Native ground and shrub nesting birds could use the Project, and breed onsite between February and August. The federal Migratory Bird Treaty Act (16 U.S. Code 703-712; 50 Code of Federal Regulations 10) prohibits the “take” of migratory birds, and protects eggs, nests, and feathers, unless permitted. Take is defined in part as “pursue, hunt, take, capture, kill, attempt to take, capture, or kill any migratory bird, any part, nest, or eggs of any such bird.” Hence, any mowing activity during the breeding season would potentially violate this federal law.

Physical Removal of Weeds

A number of the targeted weed species lend themselves to manual/hand treatments in certain circumstances. Small infestations of annuals and young seedlings can be effectively eliminated or controlled by this technique. Physical control methods range from manual hand pulling of weeds to the use of hand and power tools to uproot, girdle, or cut plants. The Weed Wrench™ and Root Jack™ are lever arms with cam devices that secure stems; they are found in nurseries and may be used to pull out woody shrubs such as tamarisk or Russian olive. For localized weed control, this is the most effective method. Removal will not involve extensive digging (less than 3 inches deep). Any targeted weed could be removed from the Project at any time if digging is not involved. In addition, tools could be used at any time on disturbed sites such as roads, parking lots, trail heads, active wash bottoms and in desert washes where minor digging may be necessary. All areas at facilities would also be subject to hand treatments and the use of hand tools. No manual/hand treatment work would occur on cultural resources sites without approval from a qualified archeologist.

This effort will be focused on weed species that have a single-root mass, facilitating easy removal. Hand-pulling is less effective in large areas and with weed species that spread through an underground root system (e.g., Bermuda grass).

Hoeing and weed whipping can be employed to control weeds in small areas. However, care must be employed when using these methods adjacent to native plants, so that native plants are not damaged. Hoeing or weed whipping must only be employed before the seed has set, otherwise this disturbance would only serve to further disperse and promote the establishment of the weed species. Pertinent considerations for hoeing and weed whipping include the following:

- Hoeing works best on patches of small weeds and with weeds that have a single-root mass. It is less effective on larger weeds that can regenerate from cut roots. It will not be used on weeds approaching maturity, as seeds can mature and be released on cut plants. Hoed plant material will be bagged and removed.
- Weed whipping can be used for weed removal in limited upland areas with herbaceous plant covers; however, it will not be used on weeds approaching maturity, as seeds can mature and be released on cut plants, and care must be employed when weed whipping adjacent to native plants. Cut plant material will be bagged and removed.

Chemical Methods for Weed Removal

Herbicide applications are a widely used, effective control method for removing infestations of invasive weed species. However, inadvertent application of herbicide to adjacent native plants must be avoided, which can often be challenging when weeds are interspersed with native cover.

Permitting and Regulatory Requirements

Before application of herbicide, contractors will be required to obtain any required permits or certifications from state and local authorities. Current requirements call for county applicator permits and a BLM Pesticide Use Permit. In addition, a certified applicator needs to be present.

If pesticides are applied to aquatic plants in waters of the U.S., then a filing under the state general National Pollutant Discharge Elimination System (NPDES) permit (Water Quality Order No. 2004-0009-DWQ) would be necessary. BLM requires the weed coordinator to be currently certified as an Integrated Pest Management and Pesticide Applicator. This training is provided by BLM in course #9000-1 (Certification Integrated Pest Management and Pesticide Application Certification). This certification is good for 3 years. In addition, tailgate training in pesticide handling will be provided to crews. Permits may contain additional terms and conditions that go beyond the scope of this plan. Only a State of California and federally certified contractor, who is also approved by BLM, will be permitted to perform herbicide applications. All herbicides will be applied in accordance with applicable laws, regulations, and permit stipulations. Only herbicides and adjuvants approved by the State of California and Federal agency for use on public lands will be used within or adjacent to the Project.

The *Final Environmental Impact Statement on Vegetation Treatment on BLM Lands in Seventeen Western States* lists 10 herbicides acceptable for use on BLM lands (USDI 2007). Guidelines for the use of chemical control of vegetation on BLM lands are presented in the *Chemical Pest Control Manual* (BLM 2009a.). These guidelines require submittal of a pesticide use proposal (PUP) and pesticide application records (PAR) for the use of herbicides on BLM lands. Sample BLM forms required for the submittal of a PUP and PAR are included in Attachment DR-BIO-69-B and Attachment DR-BIO-69-C, respectively.

The Applicant will submit PARs for each use of herbicides on BLM lands within 24 hours of application. The occurrence of noxious weeds within the Project footprint, or where the weeds occur, will be reported to the BLM district office. The appropriate weed control procedures, including target species, timing of control, and method of control, will be determined in consultation with BLM personnel. The Applicant will be responsible for providing the necessary trained personnel or hiring a contractor to implement the required weed control procedures.

If during the performance of any weed control effort covered under this document, any archaeological or cultural values are discovered, the control effort will be immediately suspended until a cultural clearance can be obtained from a qualified Archaeologist. If target species are located on a cultural resource site, then control at that Project will be deferred until the significance can be determined and appropriate mitigation instituted. As an example, trees planted around an old mining cabin might be left as part of a project.

Types of Herbicides

Herbicides may be characterized as pre-emergent, post-emergent, selective and nonselective. A pre-emergent herbicide is one that generally controls un-germinated seeds by inhibiting germination. Post-emergent herbicides are generally lethal to emerged plants. A few herbicides have both pre- and post-emergent activity. Herbicides can be selective or non-selective. If an herbicide is selective, it will have activity on some species of plants and not others, often distinguishing between monocots (grasses) and dicots (broadleaf plants). A non-selective herbicide is one that is lethal to any plant species to which it is applied.

Herbicides kill plants through either contact or systemic action. Contact herbicides are most effective against annual weeds and kill only the plant parts on which the chemical is deposited. Systemic herbicides are absorbed either by roots or foliar parts of a plant and are then translocated within the plant system to tissues that might be remote from the point of application. Although systemic herbicides can be effective against annual and perennial weeds, they are particularly effective against established perennial weeds.

Pre-emergent herbicides inhibit germination of annuals from seed, but generally do not control perennial plants that germinate from bulbs, corms, rhizomes, stolens, or other vegetative structures. Common pre-emergent herbicide classes include the following:

- Dinitroaniline Type**:** Examples of this class are pendimethalin (Weedgrass™), trifluralin (Treflan™), benefin (Balan™), and combinations of these. These herbicides provide for pre-emergence control of annual grasses and other annuals. They are mitotic (cell division) inhibitors and are primarily effective in inhibiting root growth of germinating seeds. Selectivity is physiological or chemical in nature. Some of these herbicides could be lost by volatilization, and will not be applied in temperatures above 90 degrees Fahrenheit (°F). All of these herbicides need to be watered into the soil for proper activation. Some can persist for several months.

- Dithiopyr (Dimension™) belongs to a new class of herbicide known as pyridines. It is a selective herbicide primarily used for pre-emergence annual grass control in established turfgrass. However, it can be used for post-emergence control of young grass seedlings. It inhibits cell division and cell growth of meristematic regions (growing points of roots and shoots). Dithiopyr is lost from soil by chemical and microbial degradation.

The most commonly used post-emergent, non-selective herbicides contain a family of chemicals called glyphosates (N-[phosphonomethyl] glycine). Glyphosate (Rodeo™, Roundup™, and Accord™) is a non-selective, systemic herbicide that is effective on many annual and perennial plants. It works by blocking an enzyme pathway that is important for plant protein synthesis, which is most effective if full coverage over the plants leaf is accomplished. However, because of systemic action, even partial coverage can result in plant mortality. The herbicide is typically used in conjunction with linseed oil or another surfactant, which aids in spreading an even layer across the surface of the leaves. Because glyphosate can also be lost to volatilization, they will not be applied when the temperature exceeds 90°F.

The U.S. Environmental Protection Agency (EPA) has deemed glyphosate to have a relatively low degree of oral and dermal acute toxicity. It is considered to be immobile in soil and readily degraded by soil microbes to the metabolite aminomethyl phosphonic acid and then to carbon dioxide. The EPA states that it is minimally toxic to birds, fish, aquatic invertebrates, and honeybees (EPA 1993).

Proposed herbicides for the species that have been found in the BRSA are included in Table DR-BIO-69-3. The herbicides proposed for use do not require certification for application. However, BLM policy requires the direct supervision by a Certified Pesticide Applicator during application of all herbicides on public lands. Additionally, the BLM will be contacted before chemical treatments occur, as the BLM will need to complete an environmental review process as described in Section II. All treatments would be supervised or overseen by a certified BLM pesticide applicator knowledgeable in plant identification and familiar with proper herbicide application techniques. Spray application of herbicides would occur not when winds are likely to cause drift onto sensitive species or water. In addition, herbicides would not be applied when rain is anticipated to avoid washing the herbicide off the target plant into the soil, onto non-target plants or into waters.

Application and Handling

The following general precautions will be implemented for pesticide application: It is the responsibility of the pesticide user to observe all directions, restrictions, and precautions on pesticide labels. It is dangerous, wasteful, and illegal to do otherwise.

- Store all pesticides in original containers with labels intact and behind locked doors. Keep pesticides out of the reach of children.
- Use pesticides at correct label dosage and intervals to avoid illegal residues or injury to plants and animals.
- Use pesticides carefully to avoid drift or contamination of non-target areas. Surplus pesticides and containers will be disposed of in accordance with label instructions to prevent contamination of water and other hazards.
- Follow directions on the pesticide label regarding restrictions as required by state or federal laws and regulations.
- Avoid any action that may threaten a rare, threatened, or endangered species or its habitat.
- Visual observation will be made prior to any herbicide application to ensure the Project does not contain any sensitive wildlife species and the target plants do not contain active avian nests. If sensitive species are encountered then a mitigation plan will be developed that could include alternate timing or techniques. If an active nest is encountered, target plant locations would be recorded, and treatment would be postponed until after the nest is abandoned.
- The rate of application is determined by the label directions. Method of application would conform to label directions. Each treatment effort will be documented on appropriate state and BLM forms included as Attachment BIO-DR-69-B and Attachment BIO-DR-69-C.

Table DR-BIO-69-3 Proposed Herbicides

Species	Herbicide Trade Name	Herbicide Common Name	Notes[1]
Bromus madritensis ssp. *madritensis*	Roundup	Glyphosate	Physical removal techniques may be preferred for this species.
Bromus tectorum	Roundup	Glyphosate	Physical removal techniques also may be used, if needed.
Chenopodium murale	Roundup	Glyphosate	Physical removal techniques may be preferred for this species.
	Garlon, Pathfinder	Triclopyr	
Erodium cicutarium	Roundup	Glyphosate	Physical removal techniques also may be used.
Salsoa tragus	Roundup	Glyphosate	Physical removal techniques also may be used.
Schismus sp.	Roundup	Glyphosate	The small surface area of leaves can make application of herbicide problematic; therefore, if needed, physical removal techniques may be preferred.

1. Other herbicides may be proposed based on the final version of EA Number CA-650-2005-108 or as requested by the BLM Natural Resources Specialist at the Ridgecrest Field Office

Sources: USDI 2007, Harris 2005, and Harris pers. comm..

Cut Stump technique

This technique involves cutting the trunk of the target plant about 3-6 inches from the soil surface. This would be done with hand or mechanical tools such as chainsaws, clearing saw, axes, hand saws and/or hatchets. The debris would be stacked to provide wildlife cover. Immediately following cutting (within 15 minutes), the remaining stem or trunk would be painted or hand sprayed with the herbicide following label directions. The herbicide would be applied with hand equipment such as back pack sprayers, small tank sprayers (2-3 gallon) or small hand sprayers. No powered sprayers would be used. The herbicide is applied at low pressure and is allowed to cover the top of the cut stump and dribble down the sides of the stump. With this technique, only the target plants are hit with the herbicide. Where the target plant occurs as large numbers of small >3/8” diameter dense stands where a clearing saw is used, a more general spray is used to wet the tops of the cut stems. To avoid the potential impacts to insects, amphibians and fish species, the use of small surface area spray application equipment shall be used as well as the use of the smallest possible amount of herbicide at any one time. In addition, herbicides shall be applied with nozzle tips that produce large droplets (not mist) and spray pressures no greater than are required to obtain adequate coverage. Spray application of herbicides shall not be applied when winds are likely to cause drift onto sensitive species or

water. Herbicide application to target species would occur from early spring when target plants are at high moisture contents through late fall when the target plants are translocating their nutrients to the roots for winter storage. A strong sap flow enhances the absorption of herbicides and translocation of the herbicide to the root system.

Triclopyr, sold under the trade name of Pathfinder and "Garlon 4," or Glyphosate, sold under the trade names of "Rodeo" and “Aquamaster” (Rodeo is the old name for Aquamaster) are proposed to be used. Garlon 4 and/or Pathfinder herbicides would be used to treat species such as terrestrial tamarisk, which is found in upland areas. Species adjacent to open water, such as tamarisk (within 10 feet) would be treated with Aquamaster (Rodeo). The rate of application would be determined by the label directions. Method of application would conform to label directions. Pathfinder and Aquamaster are both premixed and would be applied straight to the target species. A 100 percent solution would be applied to freshly cut stumps, or the basal bark, as prescribed under the Cut Stump or Basal Bark methods. An agriculturally-approved marking dye would be added to the herbicide solution to aid in identifying treated individuals. This should prevent double application and missing any target plants. This technique could be used for species such as tamarisk and alanthus. Chainsaws and other motorized equipment to cut targeted weed species would not be used except where plant diameter, density and/or size of infestation require such use to be practical. At this time, the use of such equipment is anticipated only if tamarisk infestations are found that are unusually thick and large.

Foliar Spray technique

Foliar spraying would be used to control weeds in several situations including treatment of resprouting, treating plants that are too small to treat with cut stump methods. There would be some degree of re-sprouting from the remaining stumps and root systems of the targeted plants initially treated with the "cut stump" method, and the establishment of pioneer plants as unoccupied habitat becomes available. Herbicide application is required to completely kill the remaining root system to prevent or prohibit re-growth from the remaining stump and surface roots. The method of treatment for re-sprouts and pioneer plants would be foliar application of herbicide to plants less than six feet tall. When treating re-sprouts, there is a need to wait several years until the re-sprout has enough surface area to absorb sufficient herbicide to kill the root system. Control of a number of perennial herbaceous weeds is only accomplished by herbicide applications which kill the extensive root systems. Telar is not currently approved for use on BLM lands in California and is not proposed for use in this WMP.

With this technique, an herbicide would be applied with hand equipment such as back pack sprayers, small tank sprayers (2-3 gallon) or small hand sprayers. No powered sprayers would be used except where power sprayers could be used. To avoid the potential impacts to insects, amphibians and fish species, the use of small surface area spray application equipment shall be used as well as the use of the smallest possible amount of herbicide at any one time. In addition, herbicides shall be applied with nozzle tips that produce large droplets (not mist) and spray pressures no greater than are required to obtain adequate coverage. Spray application of herbicides shall not be applied when winds are likely to cause drift onto sensitive or non-target

species or water. Herbicide application to woody target species would occur from early spring when target plants are at high moisture contents through late fall when the target plants are translocating their nutrients to the roots for winter storage as a strong sap flow enhances the absorption of herbicides and translocation of the herbicide to the root system. Herbaceous weeds would be treated in the spring and early summer.

Wipe Method

This technique uses a carpet like fabric pad or roller attached to a sprayer in place of the spray tip to apply the herbicide to the target foliage. In use, the herbicide is allowed to flow onto the pad/roller and is applied to the target foliage by brushing thereby transferring the herbicide to the foliage. Application sites, target species, herbicides, season of use and most safety precautions are the same as the foliar spray technique. This technique differs in that there is no spray to drift. Also there is no overspray with impact to non-target species.

Monitoring and Evaluation

Once treatments are initiated, monitoring will be initiated to collect data on percent kill, survival, damage to non-target species, reinvasion of weed species, reintroduction of native species and the need for re-treatments. The monitoring will be conducted yearly until the weeds are eradicated and then would be checked every 2 to 5 years. Treatments over or adjacent to water would include monitoring for water quality as specified in the California State guidelines and BLM guidance.

Limitations

Herbicide applications must follow EPA label instructions. Application of herbicides will be suspended when any of the following conditions exists:

- Wind velocity exceeds 6 miles per hour (mph) during application of liquids or 15 mph during application of granular herbicides.
- Snow or ice covers the foliage of noxious weeds.
- Precipitation is occurring or is imminent.
- Air temperatures exceed 90°F.

Transport and Mixing

During the construction phase, herbicides will be transported to the Project daily with the following provisions:

- Only the needed quantity for that day's work will be transported.
- Concentrate will be transported in approved containers only and in a manner that will prevent tipping or spilling, and in a location that is isolated from the vehicle's driving compartment, food, clothing, and safety equipment.
- Mixing will be done offsite, over a drip-catching device, and at a distance greater than 200 feet from open or flowing water, wetlands, or other sensitive resources. No herbicides will be applied at these areas unless authorized by appropriate regulatory agencies.

- Herbicide equipment and containers will be inspected for leaks daily. Disposal of spent containers will be in accordance with the herbicide label.

During the operations phase of the Project, herbicides will be stored only in cabinets of approved design and will be under lock and key.

Spray Methods. Vehicle-mounted sprayers (e.g., handgun, boom, and injector) will be used mainly in open areas that are readily accessible by vehicle. Hand application methods (e.g., backpack spraying) that target individual plants will be used to treat small or scattered weed populations in rough terrain. Calibration checks of equipment will be conducted at the beginning of spraying and periodically throughout treatment to ensure that proper application rates are achieved.

Herbicide Spills and Cleanup. Reasonable precautions will be taken to avoid herbicide spills. In the event of a spill, immediate cleanup will be implemented. Contractors will keep spill kits in their vehicles and in herbicide storage areas to allow for quick and effective response to spills. The following items are to be included in the spill kit:

- protective clothing and gloves,
- absorptive clay, “kitty litter,” or other commercial adsorbent,
- plastic bags and bucket,
- shovel,
- fiber brush and screw-in handle,
- dust pan,
- caution tape,
- highway flares (use on established roads only), and
- detergent.

Response to herbicide spills will vary with the size and location of the spill, but general procedures include the following:

- BLM notification,
- traffic control,
- dressing the cleanup team in protective clothing,
- stopping the leaks,
- containing the spilled material,
- cleaning up and removing the spilled herbicide or contaminated adsorptive material and soil, and
- transporting the spilled pesticide and contaminated material to an authorized disposal Project.

Controlling Post-emergent Herbaceous Vegetation. To control herbaceous weedy vegetation, implement as follows:

- Apply a foliar application of Rodeo™ on each plant at a minimum rate of 2.5 percent (plus 2 percent by volume [V/V] of nonionic surfactant).
- Provide applications on a spray-to-wet basis with coverage uniform and complete.
- Avoid contact with established native shrub and grass species.
- Temporarily discontinue work in the event of gusty winds or winds in excess of 6 mph.
- Temporarily discontinue in the event of rainfall.
- Ensure applicators possess current pest control licenses valid in the State of California and wear gloves, masks, and long sleeves as protection from chemical injuries.
- Leave sprayed vegetation undisturbed for 7 days until visible effects of herbicide application are present consisting of wilted and brown foliage and disintegration of root material. The ECM will determine when adequate time has been allowed for this.
- Remove all treated plant material using a flail mower or other appropriate means, and dispose of offsite at an appropriate landfill site.
- Cover all loads while removing vegetation using a tarpaulin.

Controlling Woody Vegetation. Woody vegetation will be controlled using cut and paint method of removal. To control woody vegetation, implement as follows:

- Cut sprouts or woody stems to a height of 12 inches or less above ground and remove all aboveground debris for disposal at a suitable landfill.
- Apply Round-Up™ or Rodeo™ at a 100 percent rate to the cut sprout within 2 minutes of cutting the stem.
- Apply Rodeo™ in areas that are in immediate contact with wetlands and/or other water bodies; Round-up™ will be used elsewhere. The ECM will determine the appropriate herbicide to use at each location.
- Cover all loads while removing vegetation using a tarpaulin.
- Apply follow-up foliar applications as described in the previous section to stem re-growth that occurs after initial control effort.
- Continue monitoring cut stems for as long as necessary to ensure complete mortality.

Controlling Pre-emergent Vegetation. Generally, it is anticipated that there are few areas where pre-emergent vegetation control would be required. Pre-emergent herbicides work only on vegetation reproducing from seed, and are not effective on other types of propagules, such as re-sprouts from root crowns, which have been cut, rhizomes, or other material. The following situations may require use of pre-emergent herbicides:

- Areas that have repeated weed problems with annual plants, with evidence of a robust weed seed crop in the seed bank, will be sprayed with pre-emergent herbicides during appropriate pre-germination periods.
- Areas beneath the arrays, because they will receive overflow of wash water, can be particularly vulnerable to weed infestations.
- Areas surrounding the developed plant facilities, where vegetation is not planted, could benefit from pre-emergent treatments if weed problems are persistent.

Generally, pre-emergent herbicides would not be appropriate for revegetation areas or other native habitats because they are likely to inhibit the germination and growth of desirable native plant seed being used for restoration.

D. Implementation Schedules

Implementation schedules will be sufficiently flexible to take advantage of the variable precipitation regime of the eastern Mojave Desert.

E. Employee Education and Training

Educating personnel as well as the local landowners and users is essential for an integrated approach to weed prevention and management. The more knowledge exists about weed issues, the more support there will be for weed control efforts. It is important that all levels of management be aware of the weed problem. General meetings that focus on noxious weeds and feature weed videos are good ways to spread the word. It may be useful to have some brief identification training at these meetings as well.

F. Enforcement

None of the proposed control activities will involve the use of motor vehicles, mechanical transport, or the landing of aircraft inside a designated wilderness area. None of the proposed control activities will involve the use of motor vehicles or mechanical transport off of existing ways, i.e., designated vehicle routes, inside of a wilderness study area. The use of chemicals or motorized/mechanized equipment other than vehicles will be permitted only where it is determined to be the minimum action necessary to effectively control the targeted weed species. Any such use will be restricted to use in a manner which is least impacting to the Project.

VII. REPORTING REQUIREMENTS

Implementation of the noxious weed management plan will include the following data collection and reporting elements.

A. Construction Monitoring Reports

During the construction phase, ongoing reporting on noxious weed management will be included in all monitoring reports. Construction weed monitoring reports will include the following information:

- Survey findings on location, type, extent, and density of noxious weeds. This data will include mapping and photographs, as appropriate, as well as textual and tabular data content to fully describe conditions on the Project.
- Management efforts, including date, location, type of treatment implemented, and results. Ongoing evaluation of success of treatment will be included.
- Information on implementation and success of preventative measures, including status of equipment wash facilities and summary data of use; data on the worker environmental training program, including participants.
- Summary description of restoration efforts undertaken, adaptive measures employed based on on-the-ground conditions, and the current status of the effort.

Weekly and Quarterly Reports

Reporting during construction will include weekly summary reports describing observations and activities relevant to weeds management, and a compilation and analysis of this information will also be included in quarterly reports.

B. Post-Construction Report

Upon completion of construction activities, a Post-Construction Report will be prepared describing the overall results of noxious weed management and current weed status at the Project. The Post-Construction Report will contain a section summarizing the overall results of noxious weed management, and weed status at the Project.

C. Long Term Weed Control Progress Reports

Long Term Weed Control Progress (Progress) Reports will be produced during operations of the Project. The Progress Reports will include information on noxious weeds surveys and management activities for the year, discuss whether the weed management goals for the year were met, and recommend weed management activities for the upcoming year. The surveys conducted to support this are described as follows:

- Quarterly visits will be implemented post-construction in year one. Results of quarterly visits will be summarized and reported in the second year Progress Report.
- Thereafter, semi-annual site visits will be conducted, summarized, and reported in a Progress Report through the completion of the Project.
- At the end of the Project (decommissioning), a final Progress Report will be produced to describe the current status of noxious weed management on the Project.

Progress Reports will be focused on success of eradication of noxious weeds onsite. Noxious weed management measures will be included in these reports, and will include the following relevant information:

- Survey findings on location, type, extent, and density of noxious weeds. This data will include mapping and photographs, as appropriate, as well as textual and tabular data content to fully describe conditions on the Project.
- Management efforts, including date of efforts, location, types of treatment implemented, and results. Ongoing evaluation of success of treatment will be included.
- Recommendation for ongoing maintenance monitoring efforts.

VIII. REFERENCES

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ATTACHMENT DR-BIO-69

FIGURES

Ridgecrest Solar Power Project Responses to 12/22/09 Data Requests

Figure DR-BIO-69-1 Regional Map

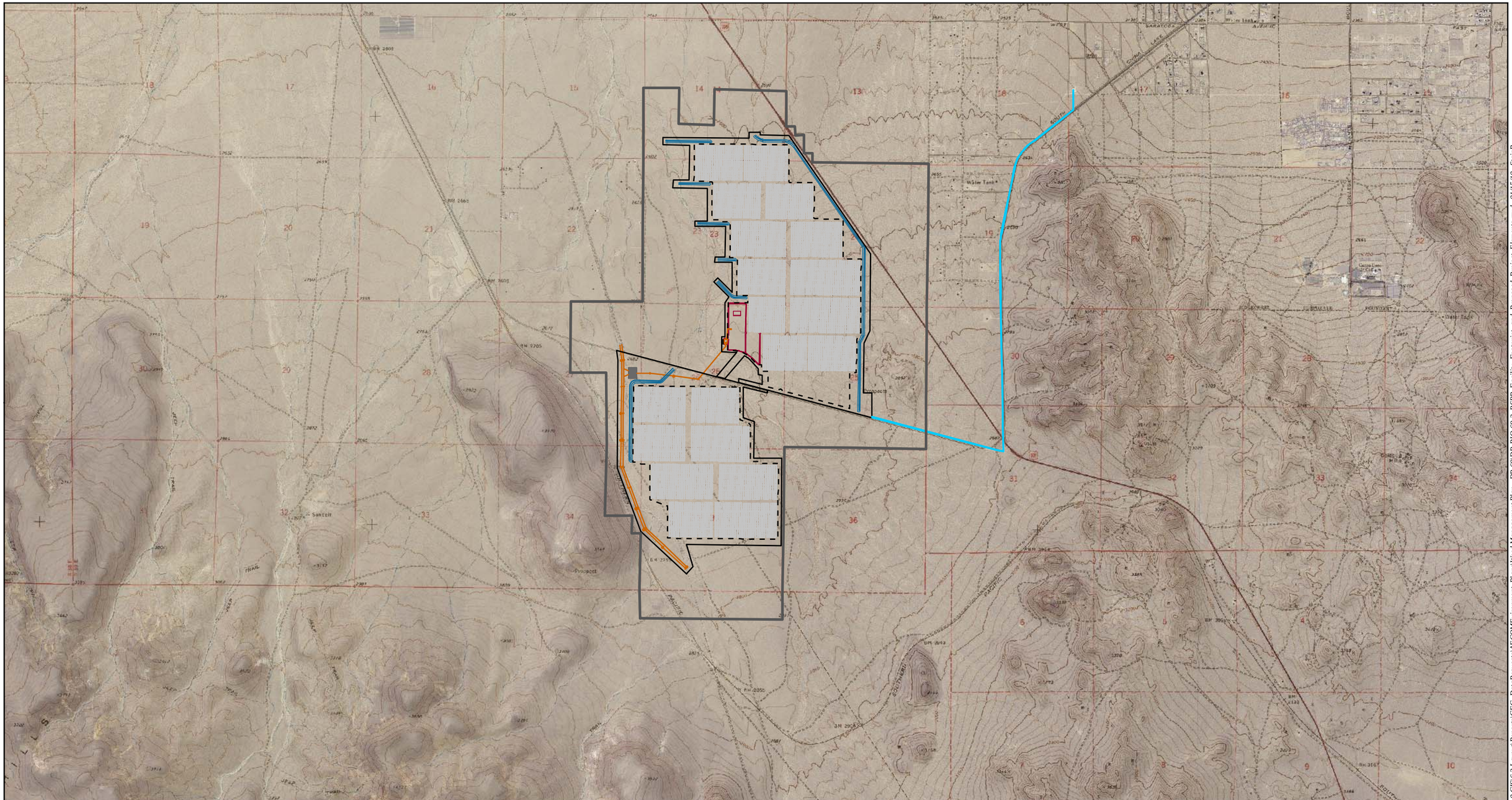
Source: ESRI; AECOM 2009

Solar Millennium

AECOM

Date: January 2010

Path: P:\2009\09080080 Sol Mil Ridgecrest\6.0 GIS\6.3 Layout\Reports\CEC_DataRequests\AECOMEvironment_Plans\Weed Management Plan - DR 69\DR-BIO-69-1_RSPP_RegionalLocation.mxd, 01/14/10, johnsonaa



Map Location

Legend

- ROW
- Facility Footprint
- Reconfigured Disturbance Area
- Water Line Disturbance Area

Proposed Project Elements

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

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
Responses to 12/22/09
Data Request

Figure DR-BIO-69-2
Proposed Project Elements and Project Area

Solar Millennium

AECOM

Date: January 2010

Path: P:\20090\80080\Sol Mil Ridgecrest\6.0 GIS\6.3 Layout\Reports\CEC_DataRequests\AECOMEvironment_Plans\Weed Management Plan - DR 69\DR-BIO-69-2_RSPP_Facility_Footprint_and_Proposed_Project_Elements.mxd, 01/15/10, SteinB

ATTACHMENT DR-BIO-69-A

LIST OF NON-NATVE AND NOXIOUS WEEDS POTENTIALLY OCCURRING ONSITE

RSPP Attachment DR-BIO-69-A: List of Non-Native and Noxious Weeds Potentially Occurring Onsite

Scientific Name	Common Name	CDFA Rating	USDA CA Rating	Cal-IPC Rating
Acacia dealbata	silver wattle			Moderate
Acacia melanoxylon	black acacia			Limited
Acacia paradoxa	kangaroothorn		BW	Eval-No List
Acaena novae-zelandica	biddy biddy		AW	
Acaena pallida	pale biddy-biddy		AW	
Achnatherum brachychaetum	punagrass	A	AW	
Acroptilon repens	Russian knapweed		BW	Moderate
Aegilops cylindrica	jointed goatgrass		BW	
Aegilops	ovate goatgrass		BW	
Aegilops triuncialis	barb goatgrass		BW	
Aeginetia			Q	
Aeschynomene rudis	rough jointvetch		BW	
Ageratina adenophora	crofton weed		Q	Moderate
Agrostis avenacea	Pacific bentgrass			Limited
Agrostis stolonifera	creeping bentgrass			Limited
Ailanthus altissima	tree-of-heaven	C		Moderate
Aira caryophyllea	silver hairgrass			Eval-No List
Albizia lopantha	plume acacia			Eval-No List
Alectra Thunb.			Q	
Alhagi maurorum	camelthorn	A	AW, PN	Moderate
Allium paniculatum	panicled onion		BW	
Allium vineale	wild garlic		BW	
Alternanthera philoxeroides	alligatorweed		AW	High
Alternanthera sessilis	sessile joyweed		Q	
Ambrosia trifida	giant ragweed		BW	
Ammophila arenaria	European beachgrass			High
Antehmis cotula	mayweed			Eval-No List
Araujia sericifera	bladderflower		BW	
Arctotheca calendula	capeweed	A	AW	Moderate
Arundo donax	giant reed			High
Asparagus asparagoides	bridal creeper			Moderate
Asphodelus fistulosus	onionweed		Q	Moderate
Atriplex semibaccata	Australian saltbush			Moderate
Avena sterilis	animated oat		Q	
Azolla pinnata	mosquito fern		Q	
Bassia hysopifolia	fivehook bassia			Limited
Bellis perennis	English daisy			Eval-No List
Brachypodium sylvaticum	slender false brome	A		
Brassica nigra	black mustard			Moderate
Brassica rapa	field mustard			Limited
Brassica tournefortii	Saharan mustard			High
Briza maxima	big quackinggrass			Limited
Bromus diandrus	ripgut brome			Moderate
Bromus hordeaceus	soft brome			Limited
Bromus japonicus	Japanese brome			Limited
Bromus madritensis ssp. rubens	red brome			High
Bromus tectorum	downy brome			High

RSPP Attachment DR-BIO-69-A: List of Non-Native and Noxious Weeds Potentially Occurring Onsite

Scientific Name	Common Name	CDFA Rating	USDA CA Rating	Cal-IPC Rating
Cabomba caroliniana	Carolina fanwort		QW	
Cakile maritima	European sea-rocket			Limited
Cardaria	lens podded hoarycress		BW	Moderate
Cardaria draba	lens podded hoarycress		BW	
Carduus acanthoides	plumeless thistle	A	AW	
Carduus nutans	musk thistle	A	AW	
Cardaria pubescens	lens podded hoarycress		BW	Limited
Carduus pycnocephalus	Italian thistle		CW	Moderate
Carduus tenuiflorus	slenderflowered thistle		CW	Limited
Carpobrotus chilensis	sea-fig			Moderate
Carpobrotus edulis	iceplant			High
Carthamu	smooth distaff thistle		BW	
Carthamus lanatus	woolly distaff thistle		BW	
Carthamus leucocaulos	whitestem distaff thistle		AW	
Carthamu	wild safflower		Q	
Caucus carota	wild carrot			Eval-No List
Cenchrus echinatus	southern sandbur		CW	
Cenchrus	coast sandbur		CW	
Cenchrus longispinus	mat sandbur		CW	
Centaurea calcitrapa	purple starthistle		BW	Moderate
Centaurea diffusa	diffuse knapweed	A	AW	Moderate
Centaurea iberica	Iberian starthistle	A	AW	
Centaurea maculosa	spotted knapweed	A	AW	High
Centaurea melitensis	Malta starthistle	C		Moderate
Centaurea monktonii	meadow knapweed	A		
Centaurea solstitialis	yellow starthistle	C	CW	High
Centaurea squarrosa	squarrose knapweed	A	AW	
Centaurea sulphurea	Sicilian starthistle		BW	
Chenopodium murale	nettleleaf goosefoot			
Chondrilla juncea	skeletonweed	A	AW	
Chorispora tenella	purple mustard		BW	Eval-No List
Chrysanthemum coronarium	crown daisy			Moderate
Chrysopogon aciculatus	pilipiliula		Q	
Cirsium arvense	Canada thistle	B	BW	Moderate
Cirsium japonicum	Japanese thistle		QW	
Cirsium ochrocentrum	yellowspine thistle	A	AW	
Cirsium undulatum	wavyleaf thistle		AW	
Cirsium vulgare	bull thistle			Moderate
Cistus ladanifer	gum rockrose			Eval-No List
Crupina vulgaris	crupina	A		Moderate
Commelina benghalensis	Benghal dayflower		Q	
Conium maculatum	poison-hemlock			Moderate
Convolvulus arvensis	field bindweed		CW	Eval-No List
Coronopus squamatus	swinecress		BW	
Cortaderia jubata	jubatagrass			High
Cortaderia selloana	pampasgrass			High
Cotoneaster lacteus	Parney's cotoneaster			Moderate

RSPP Attachment DR-BIO-69-A: List of Non-Native and Noxious Weeds Potentially Occurring Onsite

Scientific Name	Common Name	CDFA Rating	USDA CA Rating	Cal-IPC Rating
Cotoneaster pannosus	silverleaf			Moderate
Cotula coroonopifolia	brassbuttons			Limited
Crocosmia x crocosmiiflora	montretia			Limited
Crupina vulgaris	bearded creeper, common crupina		AW, Q	
Cucumis melo var. dudaim	dudaim melon		AW	
Cucumis myriocarpus	paddy melon		BW	
Cuscuta	dodder		CW, Q	
Cuscuta reflexa	giant dodder		AW	
Cynara cardunculus	artichoke thistle		BW	Moderate
Cynodon dactylon	bermudagrass	C	CW	Moderate
Cynosorus echinatus	hedgehog			Moderate
Cyperus esculentus	yellow nutsedge		BW	
Cyperus rotundus	purple nutsedge		BW	
Cytisus scoparius	Scotch broom		CW	High
Cytisus striatus	Portugese broom			Moderate
Dactylis glomerata	orchardgrass			Limited
Delairea odorata	cape-ivy			High
Descurainia sophia	flixweed			Limited
Digitalis purpurea	foxglove			Limited
Digitaria	African couch grass		Q	
Digitaria velutina	velvet fingergrass		Q	
Dimorphotheca sinuata	African daisy			Eval-No List
Dipsacus fullonum	common teasel			Moderate
Dipsacus sativus	fuller's teasel			Moderate
Dittricia graveolens	stinkwort			Moderate
Drymaria arenarioides	alfombrilla		Q	
Echium candicans	pride-of-Madeira			Limited
Egeria densa	Brazilian egeria			High
Eichhornia azurea	anchored waterhyacinth		Q	
Eichhornia crassipes	waterhyacinth		CW	
Elytrigia	quackgrass		BW	
Emex australis	three-cornered jack		Q	
Emex spinosa	devil's thorn		Q	
Ehrharta erecta	erect veldtgrass			Moderate
Ehrharta longiflora	long-flowered veldtgrass			Moderate
Eichornia crassipes	water hyacinth			High
Elaegnus angustifolia	Russian-olive			Moderate
Emex spinosa	spiny emex			Moderate
Erechtites glomerata	Australian fireweed			Moderate
Erodium brachycarpum	short-fruited filaree			Eval-No List
Erodium botrys	broadleaf filaree			Eval-No List
Erodium cicutarium	redstem filaree			Limited
Erodium moschatum	whitestem filaree			Eval-No List
Eucalyptus camaldulensis	red gum			Limited
Eucalyptus globulus	Tasmanian blue gum			Moderate
Euphorbia esula	leafy spurge	A	AW	High
Euphorbia lathyris	caper spurge			Eval-No List

RSPP Attachment DR-BIO-69-A: List of Non-Native and Noxious Weeds Potentially Occurring Onsite

Scientific Name	Common Name	CDFA Rating	USDA CA Rating	Cal-IPC Rating
Euphorbia oblongata	oblong spurge		BW	
Euphorbia serrata	serrate spurge		AW	
Euphorbia terracina	Geraldton carnation spurge		QW	Moderate
Festuca arundinacea	tall fescue			Moderate
Ficus carica	edible fig			Moderate
Foeniculum vulgare	fennel			High
Fumaria officinalis	fumitory			Eval-No List
Galega officinalis	goatsrue		Q	
Gaura coccinea	scarlet gaura		BW	
Gaura drummondii	Drummond's gaura		BW	
Gaura sinuata	wavy-leaved gaura		BW	
Genista monspessulana	French broom		CW	High
Geranium dissectum	cutleaf geranium			Moderate
Geranium molle	dovefoot geranium			Eval-No List
Geranium retrorsum	New Zealand geranium			Eval-No List
Glyceria declinata	waxy mannagrass			Moderate
Gypsophila paniculata	baby's breath		BW	
Halimodendron halodendron	Russian salt tree		AW	
Halogeton glomeratus	halogeton	A	AW	Moderate
Hedera helix	English ivy			High
Helianthus ciliaris	blueweed		AW	
Helichrysum petiolare	licoriceplant			Limited
Heracleum mantegazzianum	giant hogweed		Q	
Heteropogon contortus	tanglehead		AW	
Hirschfeldia incana	shortpod mustard			Moderate
Holcus lanatus	common velvet grass			Moderate
Homeria	Cape tulip		Q	
Hordeum marinum	Mediterranean barley			Moderate
Hydrilla verticillata	hydrilla		AW, NAW, Q	High
Hydrocharis morsus-ranae	frogbit		AW	
Hygrophila polysperma	Miramar weed		Q	
Hyoscyamus niger	black henbane		CW	
Hypericum canariense	Canary Island hypericum			Moderate
Hypericum perforatum	klamathweed		CW	Moderate
Hypochaeris glabra	smooth catsear			Limited
Hypochaeris radicata	rough catsear			Moderate
Imperata brasiliensis	Brazilian satintail		Q	
Imperata brevifolia	satintail		BW	
Imperata cylindrica	cogongrass		Q	
Ipomoea aquatica	Chinese waterspinach		Q	
Iris douglasiana	Douglas iris		CW	
Iris missouriensis	western blue flag		CW	
Iris pseudacorus	yellowflag iris			Limited
Isatis tinctoria	dyer's woad		BW	
Ischaemum rugosum	murain-grass		Q	
Iva axillaris	povertyweed		CW	
Kochia scoparia	kochia			Moderate

RSPP Attachment DR-BIO-69-A: List of Non-Native and Noxious Weeds Potentially Occurring Onsite

Scientific Name	Common Name	CDFA Rating	USDA CA Rating	Cal-IPC Rating
Lactuca serriola	prickly lettuce			Eval-No List
Lagarosiphon major	oxygen weed		Q	
Lepidium latifolium	perennial peppercress	B	BW	High
Leptochloa chinensis	Asian sprangletop		Q	
Leucanthemum vulgare	ox-eye daisy			Moderate
Limnobium spongia	spongeplant		QW	
Limnophila indica	ambulia		QW	
Limnophila sessiliflora	ambulia		Q	
Linaria genistifolia ssp. dalmatica	Dalmatian toadflax	A	AW	Moderate
Linaria vulgaris	yellow toadflax			Moderate
Lobularia maritima	sweet alyssum			Limited
Lolium multiflorum	Italian ryegrass			Moderate
Lotus corniculatus	birdsfoot trefoil			Eval-No List
Ludwigia hexapetala	Uruguay water-primrose			High
Ludwigia peploides ssp. montevidensis	creeping water-primrose			High
Lycium ferrocissimum	African boxthorn		Q	
Lythrum hyssopifolium	hyssop loosestrife			Limited
Lythrum salicaria	purple loosestrife		BW	High
Malephora crocea	coppery mesembryanthemum			Eval-No List
Malvella leprosa	alkali mallow		CW	
Marrubium vulgare				Limited
Medico polymorpha	California burclover			Limited
Melaleuca quinquenervia	melaleuca		Q	
Melastoma malabathricum			Q	
Melilotus officinalis	yellow sweetclover			Eval-No List
Mentha pulegium	pennyroyal			Moderate
Messembryanthemum crystallinum	crstalline iceplant			Moderate
Mikania cordata	mile-a-minute		Q	
Mikania micrantha	mile-a-minute		Q	
Mimosa	giant sensitive plant		Q	
Mimosa	catclaw mimosa		Q	
Monochoria hastata	monochoria		Q	
Monochoria vaginalis	pickerel weed		Q	
Muhlenbergia schreberi	nimblewill		BW	
Myoporum laetum	myoporum			Moderate
Myostis latifolia	common forget-me-not			Limited
Myriophylllum aquaticum	parrotfeather			High
Nassella trichotoma	serrated tussock		Q	
Nerium oleander	oleander			
Nicotiana glauca	tree tobacco			Moderate
Nicotiana trigonophylla				
Nothoscordum gracile	false garlic			Eval-No List
Nothoscordum inodorum	false garlic		BW	
Nymphaea mexicana	banana waterlily		BW	Eval-No List
Olea europaea	olive			Limited
Ononis alopecuroides	foxtail restharrow		QW	
Onopordum acanthium	Scotch thistle	A	AW	

RSPP Attachment DR-BIO-69-A: List of Non-Native and Noxious Weeds Potentially Occurring Onsite

Scientific Name	Common Name	CDFA Rating	USDA CA Rating	Cal-IPC Rating
Onorpordum illyricum	Illyrian thistle	A	AW	
Onopordum tauricum	Taurian thistle	A	AW	
Opuntia aurantiaca	jointed prickly pear		Q	
Orobanch	broomrape		Q	
Orobanche cooperi	Cooper's broomrape		AW	
Orobanche ramosa	branched broomrape		AW	
Oryza longistaminata	red rice		Q	
Oryza punctata	red rice		Q	
Oryza rufipogon	perennial wild red rice, red rice		BW, Q	
Ottelia alismoides	duck-lettuce		Q	
Oxalis corniculata	creeping woodsorrel			Eval-No List
Oxalis pes-caprae	Bermuda buttercup			Moderate
Panicum antidotale	blue panicgrass		BW	
Parentucellia viscosa	yellow glandweed			Limited
Parkinsonia aculeata	Mexican Palo Verde			Eval-No List
Paspalum scrobiculatum	Kodo-millet		Q	
Peganum harmala	harmel	A	AW	
Pennisetum clandestinum	kikuyugrass		CW, Q	Limited
Pennisetum macrourum	African feathergrass		Q	
Pennisetum pedicellatum	kyasuma-grass		Q	
Pennisetum polystachyon	missiongrass		Q	
Pennisetum setaceum	crimson fountaingrass			Moderate
Phalaris aquatica	hardinggrass			Moderate
Phoenix canariensis	Canary Island date palm			Limited
Phragmites australis	common reed			Native
Physalis longifolia	long-leaf groundcherry		AW	
Physalis viscosa	grape groundcherry		BW	
Phytolacca americana	common pokeweed			Limited
Picris echioides	bristly oxtongue			Limited
Piptatherum miliaceum	smilograss			Limited
Pistia stratiotes	water lettuce		BW	
Plantago coronopus	cutleaf plantain			Eval-No List
Plantago lanceolata	buckhorn plantain			Limited
Poa pratensis	Kentucky bluegrass			Limited
Polygonum amphibium var. emersum	kelp		CW	
Polygonum cuspidatum	Japanese knotweed		BW	
Polygonum polystachyum	Himalayan knotweed		BW	
Polygonum sachalinense	giant knotweed		BW	
Polypogon monspeliensis	annual beardgrass			Limited
Potamogeton crispus	curlyleaf pondweed			Moderate
Prosopis alpataco	mesquite		Q	
Prosopis argentina	mesquite		Q	
Prosopis burkartii	mesquite		Q	
Prosopis caldenia	mesquite		Q	
Prosopis calingastana	mesquite		Q	
Prosopis campestris	mesquite		Q	
Prosopis castellanosii	mesquite		Q	

RSPP Attachment DR-BIO-69-A: List of Non-Native and Noxious Weeds Potentially Occurring Onsite

Scientific Name	Common Name	CDFA Rating	USDA CA Rating	Cal-IPC Rating
Prosopis denudans	mesquite		Q	
Prosopis elata	mesquite		Q	
Prosopis farcta	Syrian mesquite		Q	
Prosopis ferox	mesquite		Q	
Prosopis fiebrigii	mesquite		Q	
Prosopis hassleri	mesquite		Q	
Prosopis humilis	mesquite		Q	
Prosopis kuntzei Harms ex Hassler	mesquite		Q	
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	kiawe		Q	
Prosopis palmeri S. Watson	mesquite		Q	
Prosopis reptans Benth.	tornillo		Q	
Prosopis rojasiana Burkart	mesquite		Q	
Prosopis ruizlealii Burkart	mesquite		Q	
Prosopis ruscifolia Griseb.	mesquite		Q	
Prosopis sericantha	mesquite		Q	
Prosopis strombulifera	Argentine screwbean		AW, Q	
Prosopis torquata	mesquite		Q	
Prosopis	velvet mesquite		Q	
Prunus	cherry plum			Limited
Pyracant	firethorn			Limited
Ranuncul	creeping buttercup			Limited
Raphanu	radish			Limited
Retama	bridal broom			Moderate
Ricinus	castorbean			Limited
Robinia	black locust			Limited
Rorippa austriaca	Austrian field cress		BW	
Rorippa sylvestris	creeping yellow field cress		QW	
Rottboellia cochinchinensis	itchgrass		Q	
Rubus armeniacus	Himalaya blackberry			High
Rubus fruticosus	wild blackberry complex		Q	
Rubus moluccanus	wild blackberry		Q	
Rumex acetosella	red shorrel			Moderate
Rumex crispus	curly dock			Limited
Saccharum spontaneum	wild sugarcane		Q	
Sagittaria sagittifolia	arrowhead		Q	
Salsola collina	spineless Russianthistle		QW	
Salsola paulsenii	barbwire Russianthistle		CW	Limited
Salsola tragus	common Russianthistle	C	CW	Limited
Salsola vermiculata	wormleaf salsola, wormleaf saltwort	A	AW, Q	
Salvia aethiopis	Mediterranean sage		BW	
Salvia virgata	southern meadow sage		AW	
Salvinia auriculata	giant salvinia, salvinia		Q, QW	
Salvinia biloba	giant salvinia		Q	
Salvinia herzogii	giant salvinia		Q	
Salvinia molesta	giant salvinia		Q	
Saponaria officinalis	bouncingbet			Limited
Schinus molle	Peruvian peppertree			Limited

RSPP Attachment DR-BIO-69-A: List of Non-Native and Noxious Weeds Potentially Occurring Onsite

Scientific Name	Common Name	CDFA Rating	USDA CA Rating	Cal-IPC Rating
Schinus terebinthifolius	Brazilian peppertree			Limited
Schismus arabicus	Mediterranean grass			Limited
Schismus barbatus	Mediterranean grass			Limited
Scolymus hispanicus	golden thistle	A	AW	
Senecio jacobaea	tansy ragwort		BW	Limited
Senecio squalidus	Oxford ragwort		BW	
Sesbania punicea	scarlet wisteria			High
Setaria faberi	giant foxtail		BW	
Setaria	cattail grass		Q	
Silybum	blessed milkthistle			Limited
Sinapis	wild mustard			Limited
Sisymbriu	London rocket			Moderate
Solanum cardiophyllum	heartleaf nightshade		AW	
Solanum carolinense	Carolina horsenettle		BW	
Solanum dimidiatum	Torrey's nightshade		AW	
Solanum elaeagnifolium	white horsenettle		BW	Eval-No List
Solanum lanceolatum	lanceleaf nightshade		BW	
Solanum marginatum	white-margined nightshade		BW	
Solanum tampicense	wetland nightshade		Q	
Solanum torvum	turkeyberry		Q	
Solanum viarum	tropical soda apple		Q	
Sonchus arvensis	perennial sowthistle	A	AW	
Sonchus asper	spiny sowthistle			Eval-No List
Sorghum halepense	johnsongrass		CW	
Sparganium erectum	exotic bur-reed		Q	
Spartium junceum	Spanish broom			High
Spermacoce alata	borreria		Q	
Sphaerophysa salsula	Austrian peaweed		AW	
Striga	witchweed		Q	
Striga asiatica	witchweed		AW	
Symphytum asperum	rough comfrey		BW	
Taeniatherum caput-medusae	medusahead		CW	High
Tagetes minuta	wild marigold		AW	
Tamarix aphylla	Athel tamarisk	B		Limited
Tamarix parviflora	smallflower tamarisk	B		High
Tamarix ramosissima	salt cedar	C		High
Taraxacum officinale	common dandelion			Eval-No List
Torilis arvensis	hedge parsely			Moderate
Tragopogon dubius	yellow salsify			Eval-No List
Tribulus terrestris	puncturevine	C	CW	
Tridax procumbens	coat buttons		Q	
Trifolium hirtum	rose clover			Moderate
Ulex europaeus	gorse		BW	
Undaria pinnatifida	wakame			Limited
Urochloa panicoides	liverseed grass		Q	
Verbascum thapsus	common mullein			Limited
Vicia villosa	hairy vetch			Eval-No List

RSPP Attachment DR-BIO-69-A: List of Non-Native and Noxious Weeds Potentially Occurring Onsite

Scientific Name	Common Name	CDFA Rating	USDA CA Rating	Cal-IPC Rating
Vinca major	big periwinkle			Moderate
Viscum album	European mistletoe		BW	
Vulpia bromoides	squirretail fescue			Eval-No List
Vulpia myuros	rattail fescue			Moderate
Washingtonia robusta	Mexican fan palm			Moderate
Zantedeschia aethiopica	calla lily			Limited
Zygophyllum fabago	Syrian beancaper		AW	

Definitions:

CDFA Rating

A- Either not known to be established in California or it is present in a limited distribution that allows for the possibility or eradication or containment. Eradication, containment, rejection, or other holding action at the state-county level.
Quarantine interceptions to be rejected or treated at any point in the state.

B- More wide spread. Eradication, containment, control or other holding action at the discretion of the commissioner. State endorsed holding action and eradication only when found in a nursery.

C- Generally widespread throughout the state. Action to retard spread outside of nurseries at the discretion of the commissioner. Reject only when found in a crop seed for planting or at the discretion of the commissioner.

USDA CA Rating

†Code	Weed Status
AW	A list (noxious weeds)
BW	B list (noxious weeds)
CW	C list (noxious weeds)
NAW	Noxious aquatic weed
PN	Public nuisance
Q	Quarantine
QW	Q list (temporary "A" list noxious weed, pending final determination)

CAL-IPC Rating

High-These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed.

Moderate-These species have substantial and apparent-but generally not severe-ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, although establishment is generally dependent on ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited-These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

ATTACHMENT DR-BIO-69-B

EXAMPLE BLM PESTICIDE USE PROPOSAL

Example California BLM Pesticide Use Proposal

Proposal Number:_____

Reference Number:_____

FIELD OFFICE:_____**COUNTY:**_____

LOCATION:_____**DURATION OF PROPOSAL:**_____

I. PESTICIDE APPLICATION (including mixtures and surfactants):

	Trade Names	Common Names	EPA Registration No.	Manufacturer	Formulations (Liquid or Granular)	Method of Application
1						
2						
3						

MAXIMUM RATE OF APPLICATION:	
USE UNIT ON LABEL:	**POUNDS ACID EQUIVALENT/ACRE:**
1.	1.
2.	2.

INTENDED RATE OF APPLICATION:_____

_____

APPLICATION DATES:_____

_____

NUMBER OF APPLICATIONS:_____

_____

II. PEST (List specific pest(s) and reason(s) for application):

_____

_____

III. MAJOR DESIRED PLANT SPECIES PRESENT:_____

_____

_____

IV. TREATMENT SITE: (Describe land type or use, size, stage of growth of target species, slope and soil type).

_____

_____

ESTIMATED ACRES:_____

V. SENSITIVE ASPECTS AND PRECAUTIONS: (Describe sensitive areas [e.g., marsh, endangered, threatened, candidate and sensitive species habitat] and distance to treatment site. List measures taken to avoid impact to sensitive areas).

_____

_____

VI. NON-TARGET VEGETATION: (Describe the impacts, cumulative impacts, and mitigations to non-target vegetation that will be lost as a result of this chemical application).

_____

_____

VII. INTEGRATED PEST MANAGEMENT: (Describe how this chemical application fits into your overall integrated pest management program for the treatment area.)

_____

_____

Originator: _____ **Date:**_____

Company Name:_____ **Phone:**_____

Certified Pesticide Applicator:_____ **Date:**_____
(Signature)

Field Office Pesticide/
Noxious Weed Coordinator:_____ **Date:**_____
(Signature)

APPROVALS:

BLM Assistant **Date:**_____
Field Manager
Renewable Resources:_____
(Signature)

APPROVALS (State Office Use Only):

BLM State Pesticide Coordinator:_____ **Date:**_____

(Signature)

Deputy State Director
Natural Resources,
Lands and Planning:_____ **Date:**_____
(Signature)

_____CONCUR OR APPROVED

_____NOT CONCUR OR DISAPPROVED

_____CONCUR OR APPROVED WITH MODIFICATIONS

ATTACHMENT DR-BIO-69-C

EXAMPLE BLM PESTICIDE APPLICATION RECORDS FORM

Example California BLM Pesticide Application Records Form

1. **General Information**
   a. Project Name:_____
   b. Operator:_____
   c. Pesticide Use Proposal Number:_____
   d. Reference Number:_____

2. **Name of Applicator or Employee(s) Applying the Pesticide:**_____

_____

3. **Date(s) of Application:**_____ _____ _____
   MONTH DAY YEAR

4. **Time Frame of Application:**_____

5. **Location of Application:**_____ _____ _____ _____
   Township Range Section County

6. **Type of Equipment Used:**_____

_____

7. **Pesticide(s) Used:**

Company or Manufacturer's Name:_____

Trade Name:_____

Type of Formulation: Liquid ____ Granular ____

8. **Rate of Application Used:**
   a. Active Ingredient per Acre:_____
   b. Volume of Formulation per Acre:_____

9. **Treatment Area**

a. Actual Area Treated:_____

b. Total Project Area:_____

10. **Primary Pest(s) Involved**:_____

11. **Stage of Pest Development:**_____

12. **Site Treated:** Native Vegetation_____Seeded Vegetation_____Other_____

13. **Weather Conditions:** Wind velocity: _____Wind direction_____ Temperature_____

14. **Monitoring Record** (IF INSUFFICIENT SPACE-CONTINUE ON BACK)

Attachment DR-BIO-70

Draft American Badger Relocation/Translocation Plan

DRAFT
RIDGECREST SOLAR POWER PROJECT
AMERICAN BADGER
RELOCATION/TRANSLOCATION PLAN

© Gerald and Buff Corsi

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January 2010

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DR-BIO-70-2 American Badger Burrow Location

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I. INTRODUCTION

Ridgecrest Solar I, LLC (hereafter referred to as the Applicant), proposes to construct, own, and operate the Ridgecrest Solar Power Project (RSPP or Project). The Project would have a nominal output of 250 megawatts (MW) and consist of a single power plant utilizing two solar fields.

The RSPP site (Project site) is located in the high northern Mojave Desert in northeastern Kern County, California, about five miles southwest of the City of Ridgecrest, California (Figure DR-BIO-70-1). The Project right-of-way (ROW), for which the Applicant has applied to the Bureau of Land Management (BLM), includes approximately 3,995 acres of public lands owned by the Federal government. The Project facilities would occupy approximately 1,448 acres of the 3,995-acre site, and the total disturbance area is estimated at 1,944 acres plus an additional 16.3 acres resulting from construction of the water pipeline off site.

During Project wildlife surveys conducted in 2009, a single American badger den was detected 1,000 feet to the north of the Project disturbance area. American badger is designated as a California Species of Special Concern. While no badgers or active badger dens were detected within the Project disturbance area, most of the 1,960-acre Project disturbance area is suitable for this species. If American badgers occupy the RSPP site during Project construction, the loss of active dens and injury or mortality of individuals could occur.

This American Badger Relocation/Translocation Plan has been prepared on behalf of the Applicant, and outlines the methods that would be utilized to transport any badgers out of harm's way prior to the onset of construction activities. This would be accomplished by moving the badgers a short distance to another part of their home range (relocation) either through passive or active measures. While the Applicant does not propose moving badgers outside their home range to designated off-site areas (translocation), that process is also described in this plan solely to be responsive to the CEC data request. If it is necessary to physically move badgers out of harm's way, relocation would be the preferred method as it is more likely to be successful.

To reduce impacts on sensitive biological resources, the Project site plan was reconfigured to minimize impacts to the El Paso Wash. The Project description, including acreage calculations, presented below are based on the reconfigured site plan. However, survey results presented in this report are based on survey conducted in 2009, prior to the reconfiguration. Additional biological surveys will be conducted after the site plan has been finalized in spring 2010 to ensure that all sensitive biological resources in the new Project footprint have been accurately identified and quantified. Following completion of spring 2010 surveys, impacts to sensitive biological resources will be updated and environmental compliance documents will be revised as appropriate. The Project mitigation will be developed based on the revised impact calculations.

II. BACKGROUND

A. Project Description

The proposed Project site is entirely on Federal land, BLM ROW # CACA 49016, in Township 28 South, Range 39 East and Township 27 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 3,955 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 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 a total of approximately 1,944 acres. 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-MW solar energy facility on approximately 1,448 acres (Plant Site). 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) 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 894 acres and the south field would be 554 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, on-site access roads, a tie-in switchyard, and a land treatment unit for bioremediation or land farming of HTF-contaminated soil.

The Project would generate electric power solely via solar energy. Propane will be used to fire an auxiliary boiler overnight to support startup operations until the HTF system is up to operating temperature, at which time the generation of electricity can commence. A second fired heater will 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 could be 12" diameter or smaller depending on the Water District's determination.) A new 230- kV transmission line from the turbine generator to a new nearby switchyard will interconnect with SCE's existing 230-kV and 150-kV InyoKern/Kramer Junction transmission line located west of the Project site.

B. American Badger Occurrence on the RSPP Site

The American badger is a resident of open areas in grasslands, agricultural areas, and open shrub habitats. Badgers dig large burrows in dry, friable soils and feed mainly on fossorial mammals, including ground squirrels, gophers, rats, and mice. Badgers are active primarily during the day, but may become more nocturnal where they occur in proximity to humans. The home range of badgers has been estimated to be between 395 and 2,100 acres, with males typically having larger home ranges than females, especially during the summer breeding season. In California, mean home range across all seasons for females (n=5) was estimated at 480 acres while mean home range across all seasons for males (n=4) was estimated at 2,775 acres (Quinn 2008).

General wildlife surveys were conducted concurrently with protocol wildlife surveys (e.g., desert tortoise [*Gopherus agassizii*] and western burrowing owl [*Athene cunicularia*] surveys) and vegetation mapping was created to document all wildlife species observed on site and to assess the suitability of the RPSPP site to support special-status wildlife species. General wildlife surveys were conducted from February to June 2009. Wildlife sign and sightings were recorded and special-status species were mapped using GPS units. The Project disturbance area and buffer is dominated by Mojave creosote bush scrub but also includes Mojave Desert wash scrub, non-vegetated ephemeral dry washes, and developed land. Although most of the 1,944-acre Project disturbance area is suitable for this species, no American badgers or their sign were detected in the Project disturbance area. One American badger burrow was detected approximately 1,000 feet north of the Project disturbance area (Figure DR-BIO-70-2).

III. PLAN PURPOSE

The primary purpose of this Plan is to provide an effective and feasible strategy that would ensure the protection of American badger, a California Species of Special Concern, from the construction and operational impacts of Project development. Once this plan is approved by the California Department of Fish and Game (CDFG) and California Energy Commission (CEC), the elements described herein would become part of the Project conditions of certification, with which compliance is required.

IV. PLAN GOALS

The goals of the relocation/translocation efforts are to:

- Identify any occupied badger dens in the Project area.
- Provide a relocation/translocation strategy and protect any and all American badgers during Project implementation.
- Relocate any and all badgers detected within the Project disturbance area to another part of their home range, outside of the Project disturbance area.
- If necessary, translocate any badgers that cannot be successfully relocated to an off-site location with an adequate amount of suitable habitat.
- Minimize impacts to resident badgers and other sensitive species within any translocation site.
- Minimize stress, disturbance, and injuries to relocated/translocated badgers.

V. RELOCATION/TRANSLOCATION PLAN

This section discusses management strategies for the relocation or translocation of American badger for the RSPP. A multi-tiered approach is proposed to prevent or reduce impacts during the construction activities and operation of the Project. While mitigation often focuses on protecting animals in situ by making adjustments to construction activities near occupied burrows, moving individuals out of harm's way either a short distance to another part of their home range (relocation), or moving individuals outside their home range to designated off-site areas (translocation) is sometimes the best alternative depending on potential limitations on Project redesign and/or construction scheduling. While the Applicant does not propose moving the badgers outside their home range to designated off-site areas (translocation), that process is described in this plan solely to be responsive to the CEC data request. Relocation of badgers detected within the Project disturbance area would be the preferred option due to the increased likelihood of success.

Although no American badgers were detected within the Project disturbance area during the 2009 surveys, a badger burrow was detected within the vicinity of the Project area, and American badger are a resident to the area. Therefore, it may be necessary to move individuals out of harm's way if any are encountered within the Project disturbance area during construction. The management strategy describes:

- Pre-activity surveys, and
- Relocation and translocation strategies.

The multi-tiered approach requires pre-activity surveys to determine if American badgers are present within the Project disturbance area, relocation and translocation strategies, and monitoring for American badger activity within the Project disturbance area during construction activities. The Applicant is not proposing post release monitoring of relocated and/or

translocated individuals at this time; however , the Applicant will engage CDFG in consultation to determine if it is necessary. The schedule for relocating/translocating badgers would be outside the known cub rearing season and in advance of the anticipated construction start date to minimize the likelihood of individuals returning to the site. The following sections describe the recommended relocation/translocation methods and incorporate measures to minimize the likelihood of this species returning to the capture site.

A. Pre-activity Surveys

A pre-activity survey of the Project disturbance area would be conducted outside of the cub-rearing season (March and April) prior to construction to locate and identify active American badger burrows. Surveys would be conducted in conjunction with pre-activity surveys for western burrowing owl (WBO) and desert tortoise (DT) (see Attachment DR-56 Ridgecrest Solar Power Project Draft Burrowing Owl Relocation/Translocation Plan and the Attachment DR-54 Desert Tortoise Relocation and Translocation Plan [AECOM 2010 a and b]) and would cover the entire Project disturbance area. Burrows detected during the WBO and DT surveys will simultaneously be assessed for potential use by badgers based on their size and presence of badger sign (i.e., badger claw marks and scat). Burrows identified as having potential badger use will be marked using a GPS unit and monitored to determine badger activity. The results of the pre-activity survey and recommended protection measures based on the location of any identified American badger burrow would be provided to CDFG. Pre-activity surveys would be conducted no more than 30 days prior to construction with a follow-up pre-construction survey conducted within three to five days of construction initiation.

Potential badger dens would be monitored using remote cameras for three full days to determine if the den is occupied. Only if the den is determined to be unoccupied will it be excavated under direction of a qualified biologist (see Qualifications for Authorized Handlers below). If den activity is observed within the monitoring period, the den will be monitored for an additional five full days. A qualified biologist, in coordination with CDFG, will determine the ideal time period to excavate the den based on recommended protection measures.

If, during preconstruction surveys, American badger activity is detected at a burrow, every attempt would be made to avoid disturbance to the burrow by modifying either the placement or the timing of work activity. If construction activity cannot be moved or rescheduled, then passive relocation or translocation techniques may be implemented with permission from CDFG as long as the badger does not have juveniles that are incapable of independent survival (typically March through June).

All unoccupied but potentially suitable badger burrows located on site during the initial surveys and still present during the 30-day pre-activity survey would be carefully excavated and filled in under the supervision of a qualified biologist, prior to site grading, to ensure that badgers are not occupying on-site burrows within the disturbance footprint at the time of construction.

B. Relocation and Translocation Strategy

Methods for transporting badgers that may be found within the Project disturbance area out of harm's way may involve either relocation or translocation of individuals. Relocation would involve moving badgers a short distance to another part of their home range. Translocation

would involve moving individuals outside of their home range to a designated off-site location. Several factors would determine whether relocation or translocation of American badgers found to be actively occupying burrows on the Project site would be implemented. These factors may include the specific location of occupied badger burrows found within the Project disturbance area during pre-construction surveys and the availability of potential burrows outside of the Project disturbance area, but within the badgers' home range. The decision to proceed with relocation or translocation would be made in consultation with the CDFG and the CEC.

Passive relocation of American badgers present in the disturbance area will be attempted prior to physically moving individuals. American badgers are known to use several dens in a wide area, frequently moving between dens. American badger dens present in the disturbance area will have a one-way trap door installed to passively exclude the badger from the den and encourage them to move off site. After 48 hours post-installation, the den will be excavated and collapsed, following the same protocol as with WBO burrows. These dens will be collapsed prior to construction of the DT fence to allow badgers the opportunity to move off site without impediment. Alternatively, a qualified biologist shall trap badgers and physically relocate or translocate the individuals, dependent on which is the appropriate course of action.

There are no agency-approved protocols for relocating or translocating American badgers. Therefore, trapping, handling, and transport methods will be developed in consultation with CDFG and the CEC. In addition, site preparation, which may involve placement of artificial dens or other enhancements, and release protocols will also be developed in consultation with CDFG and the CEC.

Site Considerations and Options for Relocation and Translocation

If practical, badgers detected during pre-construction surveys would be relocated to an area within their home range, outside of the Project disturbance area on adjacent Federal property. Due to the low amount of badger sign detected within the Project disturbance area, the need for future off-site areas where badger may be translocated is considered unlikely.

The specific selection of relocation and translocation site(s) will be determined prior to the initiation of construction activities in consultation with CDFG. Once candidate areas are identified, these areas would be surveyed prior to implementing relocation or translocation activities, to determine habitat suitability and estimate existing population densities and the distribution of resident badgers. Surveys would be conducted using State and Federal guidelines. The results of these surveys would be used to determine whether the area meets the requirement of having ample suitable habitat to support relocated/translocated badgers, considering the resident badger population.

D. Qualifications of Authorized Handlers

The qualified biologist will have previous experience in live animal trapping and handling and possess the appropriate state permits. Handling of all badgers would be conducted in accordance with State trapping guidelines (excluding seasonal limits). In addition the biologist will have experience in construction monitoring, and be familiar with the sensitive resources of this project and the specific project area and habitat.

D. Reporting

An annual report would be submitted to the CEC and CDFG each fall for two years post-relocation/translocation. These reports would include, but not be limited to, the following data:

- Project name, locations, and all pertinent information pertaining to the origin site.
- Dates and locations of American badgers encountered on the Project site.
- Observations made during monitoring of active badger dens.
- Dates and success of passive relocation efforts.
- Dates of capture for active relocation/translocation efforts.
- Location and habitat information for release site.

Additional, interim reporting on the relocation/translocation efforts would be provided to CDFG and CEC via electronic mail and would include the date trapping efforts began, the date of burrow excavations, findings, and initiation of activities. Additionally, any badger injuries, mortality, or other unforeseen circumstances would be reported to all resource agencies within 24 hours.

VI. REFERENCES

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2010b Ridgecrest Solar Power Project Desert Tortoise Relocation/Translocation Plan. January.

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2008. The ecology of the American badger (*Taxidea taxus*) in California: assessing conservation status on multiple scales. Ph.D. Dissertation. University of California, Davis, Davis, California. 200 pp.

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Ridgecrest Solar Power Project Responses to 12/22/09 Data Requests

Figure DR-BIO-70-1 Regional Map

Source: ESRI; AECOM 2009

Solar Millennium

AECOM

Date: January 2010

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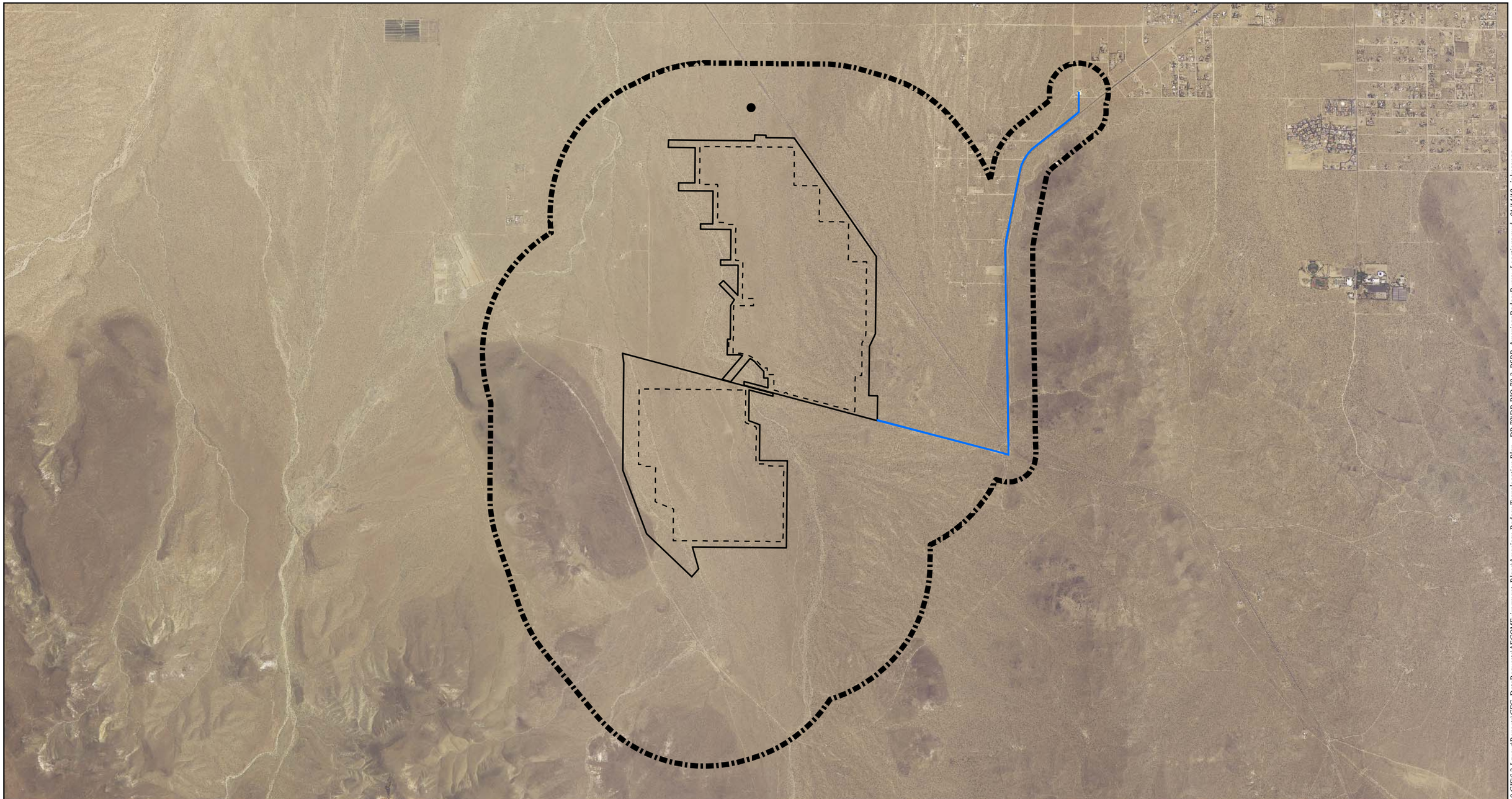

Map Location

Legend

- Facility Footprint
- Reconfigured Disturbance Area
- Water Line Disturbance Area
- Biological Resources Survey Area (BRSA)
- American Badger Burrow with Claw Marks

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
Responses to 12/22/09
Data Request

Figure DR-BIO-70-2
American Badger Burrow Location

Solar Millennium

AECOM

Date: January 2010

Path: P:\20090908080 Sol Mil Ridgecrest\6.0 GIS\6.3 Layout\Reports\CEC_DataRequests\AECOMEvironment_Plans\American Badger Translocation Plan - DR 70\DR-BIO-70-2_RSPP_AmericanBadgerBurrowLocations.mxd, 01/14/10, johnsonda

Attachment DR-BIO-76

Draft Avian Mortality Monitoring Plan

RIDGECREST SOLAR POWER PROJECT
DRAFT
AVIAN MORTALITY MONITORING PLAN

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January 2010

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DR-BIO-76-A Site Figures

DR-BIO-76-1 Regional Map

I. INTRODUCTION

Ridgecrest Solar I, LLC (Applicant) proposes to construct, own, and operate the Ridgecrest Solar Power Project (RSPP or Project). The Project would have a nominal output of 250 megawatts (MW) and consist of a single power plant utilizing two solar fields.

The RSPP site (Project site) is located in the high northern Mojave Desert in northeastern Kern County, California, about 5 miles southwest of the City of Ridgecrest, California (Figure DR-BIO-56-1). The Project right-of-way (ROW), for which the Applicant has applied to the Bureau of Land Management (BLM), includes approximately 3,995 acres of public lands owned by the Federal government. The Project facilities would occupy approximately 1,448 acres of the 3,995-acre site, and the total disturbance area is estimated at 1,944 acres plus an additional 16.3 acres resulting from construction of the water pipeline off site.

During general wildlife and point count surveys conducted in 2009, 33 species of resident and nonresident (migratory) bird species were detected on the Project site, including three species of special concern: Swainson's hawk, Western burrowing owl, and loggerhead shrike. Avian diversity was generally low across the site. This result was expected given that the primary habitat type is creosote bush scrub, a habitat type that is dominant over vast regions of the deserts of eastern California and that is known for low avian diversity. No endangered or threatened species reside on the site (AECOM 2009a).

Although there will be no native habitat remaining within the facility fence line during operations, the California Energy Commission (CEC) is concerned about possible avian mortality resulting from solar facilities. Avian mortality risk at solar power plant facilities is not well documented. Currently, only one study has been prepared, and it was prepared in 1986. More recent studies are needed to better understand this risk. Nonetheless, the 1986 study did reveal some evidence of bird mortality resulting from collisions with solar facility structures and burning from stand by points at Solar One, a large-scale solar facility located in the Mojave Desert, California. This study estimated approximately 1.9-2.2 bird deaths per week (McCrary et. al. 1986). The impact of this mortality on the local bird population was considered minimal by the authors, but, as noted, further studies are needed.

In addition to the potential risk for birds colliding with or being burned from Project facilities, birds also have the potential to collide with the transmission lines associated with the Project. The Project will relocate existing 115- and 230-kilovolt (kV) Southern California Edison (SCE) transmission lines that traverse the southwestern portion of the site (AECOM 2009a), and add 3,900 feet of new transmission line to the area. However, the relocation and addition of these transmission lines is not expected to substantially increase bird mortality beyond any current level present on the site due to the small scale of the modifications.

No State or Federal guidelines are currently in place for the construction of solar power plants with regard to minimizing avian mortality caused by large-scale solar facilities (namely, bird collisions with plant structures and burning). In contrast, there is a growing library of information

and associated guidelines regarding the impact of wind turbines on bird populations. Many states are drafting voluntary guidelines for the construction and operation of wind turbines with an emphasis on reducing bird and bat mortality, such as the 2007 *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development* (Wind Guidelines), which are based on the U.S. Fish and Wildlife Service's (USFWS) 2003 *Service Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines*.

Despite the absence of reliable, complete information demonstrating that large-scale solar power projects meaningfully contribute to avian mortality, this Avian Mortality Monitoring Plan (Plan) has been prepared on behalf of the Applicant to outline the methods that would be implemented to monitor the Project's potential impacts on birds. The Plan is based on guidelines for avian mortality studies presented in the aforementioned documents pertaining to wind energy, and includes a searcher efficiency study to correct any bias. This study will be finalized and adaptively managed in consultation with the USFWS and the California Department of Fish and Game (CDFG).

To reduce impacts on sensitive biological resources, the Project site plan was reconfigured to minimize impacts to the El Paso Wash. The Project description, including acreage calculations, presented below are based on the reconfigured site plan. However, survey results presented in this report are based on a survey conducted in 2009, prior to site redesign. Additional biological surveys will be conducted after the site plan has been finalized in spring 2010 to ensure that all sensitive biological resources in the new Project footprint have been accurately identified and quantified. Following completion of spring 2010 surveys, impacts to sensitive biological resources will be updated and environmental compliance documents will be revised as appropriate. The Project mitigation will be developed based on the revised impact calculations.

II. PROJECT DESCRIPTION

The proposed Project site is entirely on Federal land, BLM ROW # CACA 49016, in Township 28 South, Range 39 East and Township 27 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 that would need to be demolished, but existing 115- and 230-kV SCE transmission lines that traverse the southwestern portion of the

site will require relocation. Construction and operation of the RSPP would disturb a total of approximately 1,944 acres. This total includes areas outside the fence line of the Project facilities themselves, primarily rerouted drainage channels that avoid Project facilities, and access roads. An additional 16.3 acres will be disturbed off site within existing road ROW.

The Applicant proposes to develop a 250-MW solar energy facility on approximately 1,448 acres (Plant Site). 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) 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 894acres and the south field would be 554 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, on-site access roads, a tie-in switchyard, and a land treatment unit for bioremediation or land farming of 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 is up to operating temperature, at which time the generation of electricity can 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 could be 12-inch diameter or smaller depending on the Water District's determination.) A new 230-kV transmission line from the turbine generator to a new nearby switchyard will interconnect with SCE's existing 230- and 150-kV InyoKern/Kramer Junction transmission line located west of the Project site.

III. PLAN PURPOSE

The purpose of this Plan is to develop and implement a methodology to estimate the number of avian mortalities that may result from facility operation. The data resulting from this mortality survey will provide an estimate of the number of bird deaths attributable to collisions or other

interactions with Project facilities. The Plan would be developed in coordination with the CDFG and the USFWS. The information collected through this monitoring plan will be incorporated into an adaptive management strategy to determine the need for further monitoring on the Project site.

IV. PLAN GOALS

The goals of this Plan are to:

A. Estimate the number of avian mortalities resulting from facility operation.

B. Determine continued need for avian mortality trials based on adaptive management approach developed in coordination with the relevant agencies.

V. SURVEY METHODS

As no guidelines have been established for assessing avian mortality at solar power facilities, specifics of survey methodology will be developed in coordination with the CDFG and USFWS. Based on the guidelines created to assess avian mortality at wind development projects, a general outline of the avian mortality plan will be outlined here. This Plan includes methods for conducting carcass searches and estimating bias due to searcher efficiency. As requested by the CEC, the avian mortality study would be conducted on the Project site for up to two years and would contain and adaptive management element. The level of impact on avian populations in the Project area due to facility operation will be assessed in conjunction with CDFG and USFWS staff after one year, to determine if there is a need to continue monitoring for a second year. If through consultation with the agencies it is determined that a second year of monitoring is warranted, another assessment will be conducted at the end of the second year to determine the need for continued monitoring into the future.

Due to the lack of solar power plant avian mortality studies, it is not known where avian mortality is likely to occur. As a result, pilot searches will be designed in coordination with CDFG and USFWS and will be conducted prior to study implementation to assist in setting the appropriate level of search effort for the Project site. Once the pilot searches are completed, search plots will be established on the Project site where it has been determined bird collisions are to most likely occur, again through consultation with CDFG and USFWS. Within the search plots, specific locations of avian search plots will be randomly selected. The appropriate size of search plots will be determined based on the pilot searches and/or incidental observations of bird carcasses outside plot boundaries. Every effort will be made to include at least 80 percent of bird fatalities per search plot. If search plot size must be adjusted during the course of the study, the result will be adjusted to correctly quantify the final mortality estimates.

The Applicant will use trained and tested searchers who will walk each search plot in linear transects. The Wind Guidelines recommend a standard transect of 20 feet long and 20 feet wide (10 feet on either side of the centerline) to be utilized at search plots. The applicability of this

standard on the Project site will need to be determined during the pilot searches and may need to be adjusted. However, because of the lack of vegetation and the relatively level landscape within the operational Project area, the standard transect will most likely not require modification to compensate for searcher error in dense vegetation or complex topography.

All carcasses will be recorded and collected in the search areas (unless they are being used as part of a scavenging trial, discussed below). Cause of death will be determined, if possible. Where cause of death cannot be determined, it will be assumed that death resulted from Project structures given the relatively few non-Project related structures near the Project area. Carcass condition will be recorded in one of the following categories, created by Anderson et al. (1999) and recommended by the Wind Guidelines:

- **Intact** – a carcass that is not badly decomposed and shows no sign of having been fed upon by a predator or scavenger, although it may show signs of traumatic injury such as amputation from collision (and in this study, singed body parts from burning).
- **Scavenged** – an entire carcass that shows signs of having been fed upon by a predator or scavenger or a partial carcass that has been scavenged, with portions of it (for example, wings, skeletal remains, legs, pieces of skin) found in more than one location.
- **Feather Spot** – 10 or more feathers at one location, indicating predation or scavenging.

Searchers handling bird carcasses will be trained in safety procedures and permitted through all necessary State and Federal agencies. Required permits will include a Scientific Collecting Permit under the Migratory Bird Treaty Act (50 Code of Federal Regulations §21.28) and a State of California Scientific Collecting Permit under the Fish and Game Code (Section 1002 and Title 14, Sections 650 and 670.7). These permits include specific reporting requirements that will be fulfilled by the permit holders.

Data collected during each carcass search will include: a unique carcass identification number, search plot number, date, observer, species, sex, age, and when possible, time, condition (intact, scavenged, or feather spot), description of injuries, identification of and distance to nearby structures or location recorded with GPS, and distance to nearest project structure. A description of the characteristics of the carcass indicating the cause of death and other pertinent information and a photograph of the carcass will also be included. “Incidental finds,” those carcasses found by personnel outside established search times and/or search area perimeters, will be noted as such and removed from the Project area. Incidental finds will not be included in final calculations.

Searches will occur throughout the year at a frequency to be determined after the pilot searches are completed, but could occur as often as once per week. However, since bird point counts indicated higher numbers of smaller species, and small birds may decompose more quickly than large birds, more frequent searches may be warranted to improve the probability of quickly decomposing carcasses being detected.

A. Bias Correction

Researchers have noted numerous sources of bias in the carcass count that can make the extrapolated estimate of bird fatalities too high or too low. Therefore, estimates of fatalities based on plot sampling must incorporate corrections based on searcher efficiency. In general, season, topography, and vegetation influence searcher efficiency. However, it is anticipated that these factors will not heavily influence searcher efficiency due to the lack of vegetation and the relative uniformity of season and topography in the operational Project area. It is assumed that individual searcher experience will be the prime factor in searcher efficiency bias.

B. Searcher Efficiency

Searchers will vary in their ability to detect dead birds in the field because of inherent individual differences (e.g., visual acuity, experience, and training) and differences in field conditions (weather, vegetation density, and height). Morrison (2002) found that the number of carcasses that searchers found varied considerably depending on observer training, vegetation type, and size of the bird. However, due to the lack of vegetation and relatively level landscape it is not anticipated that vegetation type and other field conditions will influence the search efficiency within the operational area. Individual differences, like observer training and experience, which also affect the individual searcher's ability to detect birds of various size, will influence searcher efficiency bias.

Corrections for searcher efficiency will be based on bird size, as differences in vegetation type will not be a factor on the Project site. To correct for variation in searcher efficiency, on-site trials will be conducted to test each searcher using fresh carcasses of species likely to occur in the Project area. Observer detection rates may change as carcasses decompose; however this survey will be designed and adaptively managed to tally bird deaths as soon as possible and before identification of the carcass is too difficult to determine. Searchers will not know when trials are being conducted because awareness of the trial makes searchers more vigilant and generally improves search results. Trials will be conducted at regular intervals throughout the study and will address changes in bird size. The bird carcasses placed in the Project area for the searcher trials will be geo-referenced with a GPS and marked in a fashion that is not detectable to the searchers. The carcasses will be spread in a large area so that searchers are less likely to suspect or recognize that a trial is in progress. Trials will be conducted for all search personnel and for new searchers added to the team.

VI. REPORTING

An annual report would be submitted each winter following the fall migration season to report the results of the previous year's avian mortality surveys.

Annual reports would be submitted for at least two consecutive years to the CEC, CDFG, and USFWS. The agencies would review the reports, determine the Project's impacts on avian populations, and assess the need for continued monitoring. Reports would include, but not be limited to the following data:

- Project name and locations of all search plots surveyed;
- Dates of all avian mortality surveys conducted throughout the year;
- Total number of carcasses located, species, and cause of death (if it was determined);
- Dates and results of searcher efficiency trials;
- Pertinent information on incidental carcasses detected; and
- Estimated avian mortality

VII. CONTINGENCY PLANNING

To address any unforeseen circumstances, the Applicant is committed to implementing an adaptive management program that would adjust avian monitoring as necessary and within the constraints of Project permits and approvals. Adaptive management decisions will be made with the input from pertinent regulatory agency staff in a timely manner so that mid-course corrections can be made to ensure the avian mortality surveys are being conducted in an appropriate manner.

In the event that unforeseen circumstances arise relative to this Avian Mortality Plan, or any CEC Condition of Certification, the CEC's Compliance Project Manager for this Project, the CEC's Project Manager or the CEC Siting Office Manager will be notified by the survey lead, to resolve the issue or determine a corrective course of action.

VIII. REFERENCES

AECOM

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Map Location

1 inch = 40 miles

0 40 80 Miles

Ridgecrest Solar Power Project Responses to 12/22/09 Data Requests

Figure DR-BIO-76-1 Regional Map

Source: ESRI; AECOM 2009

Solar Millennium

AECOM

Date: January 2010

Path: P:\2009\090080 Sol Mil Ridgecrest\6.0 GIS\6.3 Layout Reports\CEC_DataRequests\AECOMEnvironment_Plans\DR-BIO-76\DR-BIO-76-1_RSPP_RegionalLocation.mxd, 01/19/10, SteinB

Attachment DR-BIO-77

Draft Desert Kit Fox Relocation/Translocation Plan

RIDGECREST SOLAR POWER PROJECT
DRAFT
DESERT KIT FOX
RELOCATION/TRANSLOCATION PLAN

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January 2010

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DR-BIO-77-3 Desert Kit Fox Observations

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I. INTRODUCTION

Ridgecrest Solar I, LLC (hereafter referred to as the Applicant), proposes to construct, own, and operate the Ridgecrest Solar Power Project (RSPP or Project). The Project would have a nominal output of 250 megawatts (MW) and consist of a single power plant utilizing two solar fields.

The RSPP site (Project site) is located in the high northern Mojave Desert in northeastern Kern County, California, about 5 miles southwest of the City of Ridgecrest, California (Figure DR-BIO-77-1). The Project right-of-way (ROW), for which the Applicant has applied to the Bureau of Land Management (BLM), includes approximately 3,995 acres of public lands owned by the Federal government and managed by BLM. The Project facilities would occupy approximately 1,448 acres of the 3,995-acre site, and the total disturbance area is estimated at 1,944 acres plus an additional 16.3 acres resulting from construction of the water pipeline off site.

During spring 2009, Project biologists completed the following surveys in the Project site: vegetation mapping; focused rare plant surveys; jurisdictional delineation of waters; general wildlife surveys; protocol Desert Tortoise surveys; protocol Western Burrowing Owl surveys; Mohave Ground Squirrel habitat suitability assessment; and avian point count surveys. Comprehensive biological resource survey methodologies were designed to meet all applicable United States Fish and Wildlife Service, BLM, California Department of Fish and Game (CDFG), and California Energy Commission (CEC) requirements. Surveys for the desert kit fox (*Vulpes macrotis arsipus*) were conducted as part of general wildlife surveys. A total of 75 desert kit fox burrows and burrow complexes, including four active complexes (three with pups confirmed), were recorded in the disturbance area. An additional 44 kit fox complexes, including four active complexes, were located in the Project site buffer.

Mitigation measures identified in the Application for Certification (AFC) (AECOM 2009a) and the Preliminary Habitat Mitigation and Monitoring Plan (AECOM 2009b) prepared for the RSPP recommend passive relocation of kit foxes to ensure avoidance of impacts from Project development. However, kit fox passive relocation may not be the most effective avoidance strategy in all instances. Attempts to relocate kit foxes via passive methods provide no guarantee that individuals would move to burrows that are not located within active construction zones. Therefore, it has been requested by the CEC that a more active avoidance strategy involving translocation of kit foxes from the RSPP to a location outside the Project disturbance area be included in this Plan. This Plan includes both passive relocation and active translocation procedures as well as a management component. However, passive relocation rather than translocation of kit fox is the preferred method due to its higher rate of success.

This Plan has been prepared on behalf of the Applicant and outlines the methods that would be implemented to protect kit foxes within Project disturbance areas and relocate kit foxes to suitable areas outside of the Project disturbance area or translocate kit foxes to suitable conservation areas away from the Project.

To reduce impacts on sensitive biological resources, the Project site plan was reconfigured to minimize impacts to the El Paso Wash. The Project description, including acreage calculations, presented below are based on the reconfigured site plan. However, survey results presented in this report are based on survey conducted in 2009, prior to the reconfiguration. Additional biological surveys would be conducted in spring 2010, after the site plan has been finalized, to ensure that all sensitive biological resources in the new Project footprint have been accurately identified and quantified. Following completion of spring 2010 surveys, impacts to sensitive biological resources would be updated and environmental compliance documents would be revised as appropriate. The Project mitigation would be developed based on the revised impact calculations.

II. BACKGROUND

A. Project Description

The proposed Project site is entirely on Federal land, BLM ROW # CACA 49016, in Township 28 South, Range 39 East and Township 27 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 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 a total of approximately 1,944 acres on-site plus an additional 16.3 acres resulting from construction of the water line off site. 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-MW solar energy facility on approximately 1,448 acres (Plant Site). 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) 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 894 acres and the south field would be 554 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, on-site access roads, a tie-in switchyard, and a land treatment unit for bioremediation or land farming of 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 is up to operating temperature, at which time the generation of electricity can 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 could be 12 inch diameter or smaller depending on the Water District's determination.) A new 230- kV transmission line from the turbine generator to a new nearby switchyard will interconnect with SCE's existing 230- and 150-kV InyoKern/Kramer Junction transmission line located west of the Project site.

B. 2009 Desert Kit Fox Survey Results

Desert kit fox surveys were conducted concurrently with general and protocol wildlife surveys and vegetation mapping (Figure DR-BIO-77-2) to document all wildlife species observed on site and to assess the suitability of the RSPP to support special-status wildlife species. General wildlife surveys were conducted from February to June 2009.

Figure DR-BIO-77-3 depicts the locations of kit fox burrows, burrow complexes, and active burrow complexes observed during surveys. A total of 75 desert kit fox burrows and burrow complexes, including four active complexes (three with pups confirmed), were recorded in the disturbance area. An additional 44 kit fox complexes, including four active complexes, were located in the Project site buffer.

III. PLAN PURPOSE

The primary purpose of this Plan is to provide an effective and feasible strategy that would reduce impacts to the desert kit fox from the construction and operational impacts of Project

development. This Plan also fulfills the Project mitigation measures identified in the AFC document (AECOM 2009a). Once this plan is approved by the CDFG and CEC, the elements described herein would become part of the Project conditions of certification, with which compliance is required.

IV. PLAN GOALS

The goals of this Plan are to:

- Provide a relocation or translocation strategy to reduce impacts to desert kit foxes during Project implementation.
- Relocate or translocate all kit foxes within the Project disturbance area to a nearby area that provides suitable denning and foraging habitat.
- Relocate rather than translocate desert kit foxes whenever feasible.
- Minimize stress, disturbance, and injuries to relocated/translocated kit foxes.
- Minimize impacts to resident kit fox and other sensitive species within any translocation site.

V. DESERT KIT FOX RELOCATION/TRANSLOCATION PLAN

This section discusses generally strategies for the relocation or translocation of kit foxes for the RSPP. The Applicant will consult with CDFG and Dr. Brian Cypher, a recognized kit fox expert with the California State University, Stanislaus, Endangered Species Recovery Program, to identify specific measures to be incorporated into the final plan. The determination of whether to capture and translocate kit foxes or use passive relocation techniques will be based on the recommendations of CDFG and Dr. Cypher.

A multi-tiered approach is proposed to reduce impacts during the construction activities and operation of the Project. While mitigation often focuses on protecting animals in situ by making adjustments to construction activities near occupied burrows, moving individuals out of harm's way to off-site locations is sometimes the best alternative when limitations on Project redesign or construction scheduling exist. Because kit foxes are resident within the Project area, it may be necessary to move individuals out of harm's way when they are within the Project disturbance area scheduled for construction.

The schedule for relocating/translocating individual foxes would be outside the breeding season. The Applicants will consult with Dr. Cypher and CDFG to determine the optimal relocation/translocation period to minimize adverse impacts to the foxes. The following sections describe the recommended relocation/translocation methods and incorporate measures to minimize the likelihood of this species returning to the capture site.

A. Pre-Activity Surveys

A pre-activity survey of the Project disturbance area would be conducted prior to the beginning of ground disturbance and/or construction activities or any project activity likely to impact the desert kit fox. The timing of the survey would be dependent upon Project schedule and consultation with Dr. Cypher and CDFG. Surveys would generally be conducted in accordance with the *U.S. Fish and Wildlife Service San Joaquin Kit Fox Survey Protocol for the Northern Range* (1999). Surveys would identify kit fox habitat features on the Project site, evaluate use by kit fox and, if possible, assess the potential impacts to the kit fox by the proposed activity. The status of all dens would be determined and mapped. Written results of preconstruction/preactivity surveys would be submitted to CDFG within 5 days of survey completion. Relocation/Translocation methods would be implemented immediately upon authorization by CDFG.

B. Passive Relocation Strategy

Passive relocation would involve monitoring all kit fox dens identified during the pre-activity survey for three days with tracking medium or an infra-red beam camera to determine the current use. If no kit fox activity is observed during this period, the den would be destroyed immediately to preclude subsequent use. If kit fox activity is observed at the den during this period, the den would be monitored for at least five consecutive days from the time of the observation to allow any resident animal to move to another den outside of the Project disturbance area during its normal activity. Use of the den can be discouraged during this period by partially plugging its entrances(s) with soil in such a manner that any resident animal can escape easily. Only when the den is determined to be unoccupied may the den be excavated under the direction of a qualified biologist familiar with mammal tracking and kit fox ecology. If the animal is still present after five or more consecutive days of plugging and monitoring, the den may have to be excavated when, in the judgment of a biologist, it is temporarily vacant, for example during the animal's normal foraging activities. Hand excavation is preferred; however, soil conditions may necessitate the use of excavating equipment.

Destruction of the den would be accomplished by careful excavation until it is certain that no kit foxes are inside. The den should be fully excavated, filled with dirt, and compacted to ensure that kit foxes cannot reenter or use the den during the construction period. If at any point during excavation a kit fox is discovered inside the den, the excavation activity would cease immediately and monitoring of the den as described above should be resumed. Destruction of the den may be completed when, in the judgement of the biologist, the animal has escaped from the partially destroyed den. Active natal and pupping dens would not be destroyed until the pups and adults have vacated the den and then only after consultation with CDFG.

C. Translocation Strategy

As described previously, relocation is the preferred option for moving kit foxes out of harm's way because it is more successful. However in order to be responsive to the CEC data request, we have included this discussion of translocation procedures.

A translocation site would be selected that is suitable for and can accommodate all species to be actively translocated from the site of the RSPP, including desert tortoise, Mohave ground squirrel, burrowing owl, desert kit fox, and American badger. Since the translocation site has not yet been selected, it is not possible at this time to describe habitat suitability or any desert kit fox population that may exist on the site. The process of selecting a suitable site is described below.

There is no agency-approved protocol for translocating desert kit fox in California; however, the following translocation procedures have been developed using strategies employed by the Endangered Species Recovery Program in relocating the federally endangered San Joaquin kit fox (*Vulpes macrotis mutica*). Prior to any translocation activities, permission would be obtained from the CDFG to relocate desert kit foxes from the site. Translocation involves the capture of individual kit foxes and moving them to a location away from the Project site with suitable habitat for the species. The translocation procedures involve translocation site selection, site management and preparation, pre-construction surveys, trapping, care of kit foxes while captured, and kit fox release. The Applicant is not proposing post release monitoring of translocated individuals at this time, however the Applicant will engage CDFG in consultation to determine if it is necessary.

Translocation Site Selection

Translocation sites could be just outside the Project disturbance area or can include areas that are farther away from the Project site. Site attributes that must be considered include habitat type, terrain, prey abundance, competitor and predator abundance, available escape cover, available acreage, land ownership and use, linkage or the ability to create linkage to other areas of habitat, and potential human disturbance. Additionally, the current status of kit foxes on a site must be considered. Since translocation sites would be considered for multiple species, there is a possibility that requirements for all species may not be met. Therefore, if kit foxes currently are not present at a given site, then the reasons for their absence need to identified, and if not done so already, these limiting factors need to be mitigated. The more optimal the site attributes at a translocation site, the higher the probability of successfully introducing kit foxes from the Project site. Sites with existing or likely future conservation status (e.g., lands acquired specifically to mitigate for Project impacts) would also be considered priority sites since conservation status is likely to ensure minimal disturbance and reduce risks from anthropogenic activities.

Translocation Site Management

Private lands acquired for kit fox translocation would be managed in perpetuity for kit fox viability and habitat suitability per a site-specific management plan to be approved by the CDFG. An appropriate monetary endowment for translocation site management would also be secured to

ensure the management plan components are implemented. A property title transfer to CDFG may also be required where private lands are acquired for translocation purposes.

Completion of a public land lease per BLM realty provisions and/or development of a Memorandum of Understanding with a local BLM field office would be necessary to utilize public lands managed by BLM for translocation. Public land status under the recently adopted Land Tenure Adjustment Plan (BLM 2005), i.e., lands identified for retention or disposal, as well as their Multiple Use Classification (Limited, Moderate or Unclassified), would be primary considerations in such an endeavor. Approval by BLM's California State Office is also required for any public land wildlife translocation.

Site-specific National Environmental Policy Act (NEPA) documentation likely would be required for any considered translocation action involving federal public lands. The BLM's multiple-use mandate would be applicable and potential translocation site management needs would need to be considered and implemented to ensure compliance with that mandate.

Translocation Site Preparation

Once an appropriate translocation site(s) has/have been identified, surveys for resident kit foxes would be conducted to characterize the existing or potential use of the translocation site by kit foxes and to determine habitat management potential.

Capture, Transportation, and Release Methods

Methods successfully employed by the Endangered Species Recovery Program for capturing, transporting and caring for San Joaquin kit foxes are recommended for the translocation of desert kit foxes (Bremner-Harrison and Cypher 2007). Those methods involve live-trapping and handling with a bag. Wire-mesh box traps (measuring 38 x 38 x 107 centimeters [cm]) would be baited with meat products. To reduce tooth injuries, each trap would contain two rope chew toys, with one attached to each end of the trap. In addition, the traps would be covered with a heavy-duty tarpaulin that provides shelter from inclement weather and shade from the sun

During the handling procedure, foxes are coaxed from the trap into a denim handling bag that is approximately 75 x 75 cm. Using this method, the animal is manually restrained, which precludes the need for chemical immobilization (and associated risks). The handling bag not only restrains the fox, but also covers its eyes and affords it a sense of security, and most foxes are generally calm while in the bag.

Foxes can be transported from capture sites to release sites in hard-plastic portable pet carriers. A carrier sized to transport a cat or small-medium dog would be sufficient for transporting kit foxes. All attempts would be made to release kit foxes within a few hours of their capture in order to avoid unnecessary stress that may result from captivity. However, if foxes are going to be retained in the carrier for more than approximately eight hours, a carrier that is sufficiently large to allow foxes to stand and move around should be used. The carriers would contain water to avoid possible dehydration resulting from the stress of capture, handling, and transportation.

Also, if foxes would be retained in carriers overnight, food would be offered. Carriers containing foxes should be placed somewhere protected, quiet, and shaded.

Foxes would be transported in a vehicle that to the extent practical maximizes their comfort and minimizes stress. Foxes would not be subjected to excessive sun, wind, noise, or vibration. Enclosed, but sufficiently-ventilated, trucks or vans would work well. Carriers would be secured such that they do not slide or tip over.

Dr. Cypher would manage the translocation program, which would include the capture, transportation, and release of all translocated kit foxes.

D. Reporting

A report would be submitted following the relocation/translocation season (August through October) in those years when kit fox relocation or translocation was implemented (primarily during years of construction). The reports would be submitted to CDFG and the CEC. These reports would include, but not be limited to the following data:

- Project name, locations, and all pertinent information pertaining to the origin site.
- Dates and locations of kit foxes detected on the Project site.
- Observations made during monitoring of active kit fox dens.
- Dates and success of passive relocation efforts.
- Dates of capture for translocation efforts.
- Date, location and habitat information for kit fox releases.

Additional, interim reporting on the relocation/translocation efforts would be provided to CDFG via electronic mail and would include the date trapping efforts began, the date of burrow excavations, findings, and initiation of activities. Any kit fox injuries, mortality, or other unforeseen circumstances would be reported to all resource agencies within 24 hours.

VI. REFERENCES

AECOM

2009a Ridgecrest Solar Power Project Application for Certification. Prepared for Solar Millennium. August.

2009b Preliminary Habitat Mitigation and Monitoring Plan, Ridgecrest Solar Power Project. Prepared for Solar Millennium. December.

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1999 U.S. Fish and Wildlife Service San Joaquin Kit Fox Survey Protocol for Northern Range. Available at: http://www.fws.gov/sacramento/es/documents/kitfox_no_protocol.pdf

ATTACHMENT DR-BIO-77-A

SITE FIGURES

DR-BIO-77-1 Regional Map
DR-BIO-77-2 Vegetation Communities
DR-BIO-77-3 Desert Kit Fox Observations

Ridgecrest Solar Power Project Responses to 12/22/09 Data Requests

Figure DR-BIO-77-1 Regional Map

Source: ESRI; AECOM 2009

Solar Millennium

AECOM

Date: January 2010

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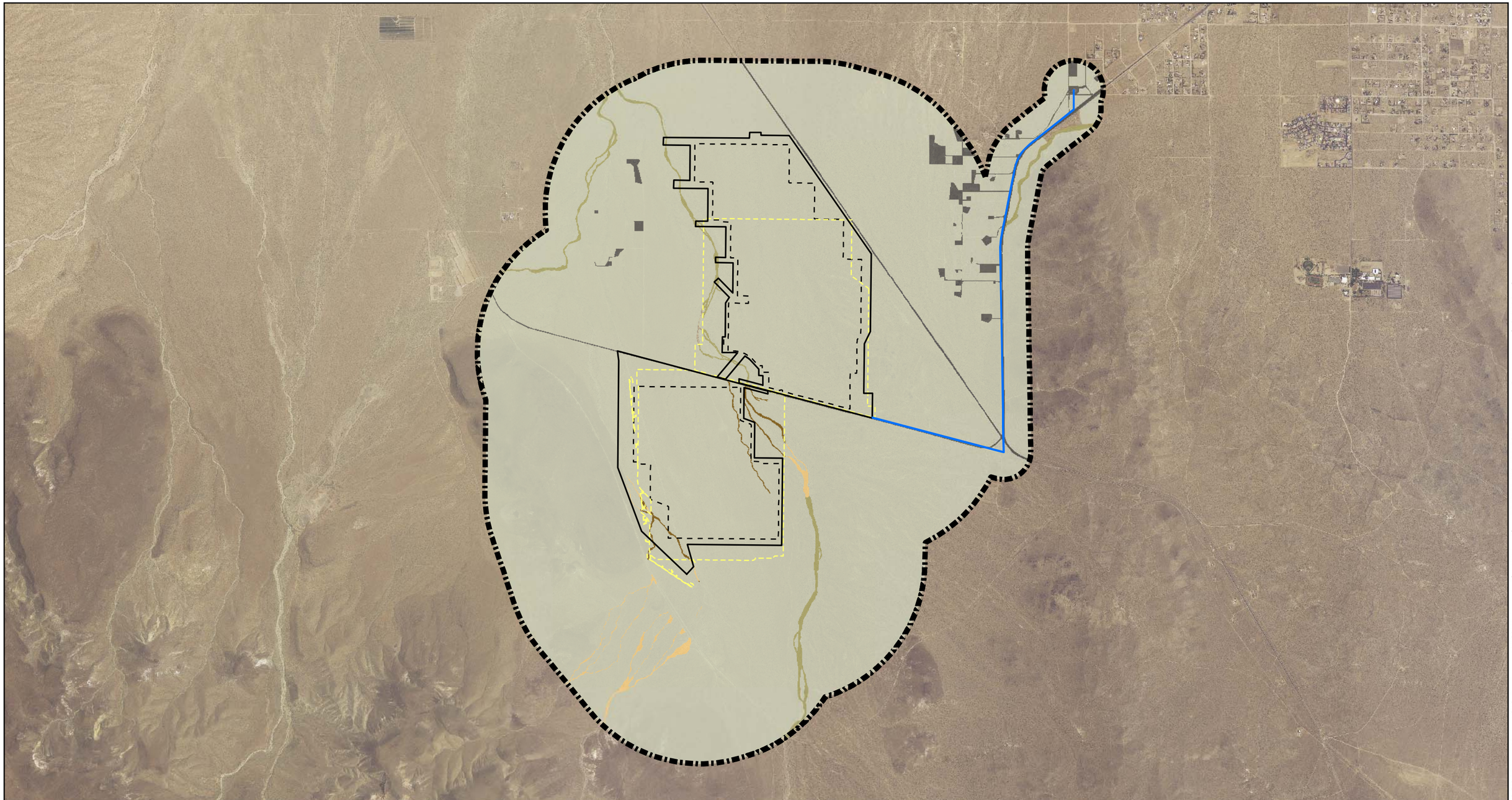

Map Location

Legend

- Surveyed Biological Resources Survey Area (BRSA)
- Facility Footprint
- Reconfigured Disturbance Area
- Water Line Disturbance Area
- Surveyed Disturbance Area

Vegetation Communities

Riparian

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

Upland

- Mojave Creosote Bush Scrub

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
Responses to 12/22/09
Data Request

Figure DR-BIO-77-2
Vegetation Communities

Solar Millennium

AECOM

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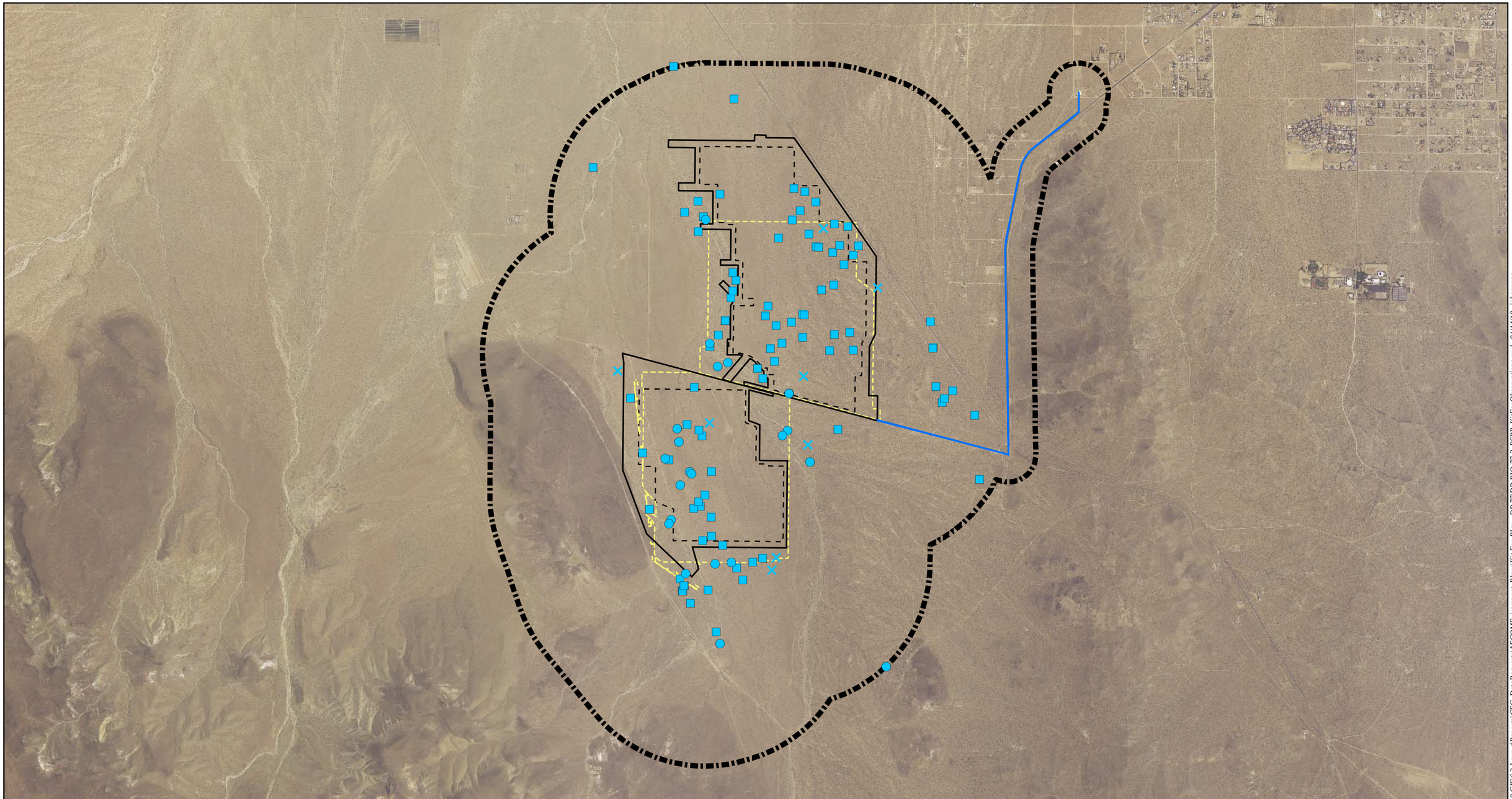

Map Location

Legend

- Biological Resources Survey Area (BRSA)
- Facility Footprint
- Reconfigured Disturbance Area
- Water Line Disturbance Area
- Surveyed Disturbance Area

Resident Special-Status Wildlife Species Observations

- Active Kit Fox Burrow Complex
- Kit Fox Burrow
- Kit Fox Burrow Complex

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
Responses to 12/22/09
Data Request

Figure DR-BIO-77-3
Desert Kit Fox Observations

Solar Millennium

AECOM

Date: January 2010

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