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Subject: 09-AFC-5C
Condition Number: BIO-6
Description: Biological Resources Mitigation, Implementation and
Monitoring Plan (BRMIMP)
Submittal Number: BIO6-01-04

March 21, 2011

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Dear Mr. Douglas,

The attached revised Biological Resources Mitigation, Implementation and Monitoring Plan is submitted for your review and approval.

Thank you.

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Attachments: Revised BRMIMP

**BIOLOGICAL RESOURCES MITIGATION AND
IMPLEMENTATION MONITORING PLAN
FOR THE MOJAVE SOLAR PROJECT,
SAN BERNARDINO COUNTY, CALIFORNIA**



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1.0 INTRODUCTION

AECOM, Inc. has been retained by Abengoa Solar Inc. to provide biological resources support for the proposed Mojave Solar Project (MSP or “Project”), a solar thermal power plant utilizing parabolic trough technology and having a combined nominal electrical output of 250 megawatts (MW) from twin 125-MW power blocks. The Project owner is Mojave Solar LLC (Mojave Solar or “Applicant”), a subsidiary of Abengoa Solar Inc. This Biological Resources Mitigation and Implementation Monitoring Plan (BRMIMP) was prepared as a requirement of the California Energy Commission (CEC) licensing process, which encompasses all thermal power plants over 50 MW proposed in California. This BRMIMP will also support Federal permits or conditions of certification associated with Federal and State biological resource agencies. The BRMIMP describes both general and resource-specific mitigation measures within the proposed plant site and discusses the methods for implementation of these mitigation measures through various monitoring plans. Since the Project potentially impacts threatened, endangered, or special-status species, both general and resources-specific mitigation measures have been outlined. This BRMIMP summarizes all the mitigation measures specific to biological resources.

The proposed Project is located approximately 15 miles northwest of Barstow, California, and approximately 9 miles northwest of Hinkley, California (Figure 1). The Project is situated near the southwest corner of Harper Dry Lake, an ephemeral alkali lake bed, in the southern section of the Lockhart U.S. Geological Survey (USGS) quadrangle and the northern section of the Twelve Gauge Lake USGS quadrangle. The Project is generally northeast of the intersection of Santa Fe Avenue with Harper Lake Road (see Figure 2). The extent of the Project Area is approximately 1,765 acres and consists of contiguous parcels of private property.

1.1 PURPOSE OF THE BIOLOGICAL RESOURCES MITIGATION IMPLEMENTATION AND MONITORING PLAN

The purpose of the BRMIMP is to identify the means (e.g., mitigation measure, responsible party, timing, schedule, action, performance standard and remedial action) by which the Project intends to minimize impacts, protect and conserve biological resources, and comply with Federal and State requirements for the Project. Table 3-1, BRMIMP Summary Table, is the principal section of this BRMIMP. Table 3-1 will guide the Project owner and other responsible parties in the implementation of the CEC’s biological Conditions of Certifications (COCs) and other biological permitting requirements for the Project and provide a tracking system for

implementation. (See Appendix A for the Biological Resources COCs as set forth in the CEC Final Decision issued September 15, 2010.)

The BRMIMP provides the following information:

- All biological resource mitigation, monitoring, and compliance measures proposed and agreed to by the Project owner;
- All applicant-proposed mitigation measures presented in the Application for Certification (AFC), data request responses, and workshop responses;
- All biological resource COCs identified as necessary to avoid or mitigate impacts;
- All biological resource mitigation, monitoring, and compliance measures required in Federal agency terms and conditions, such as those provided in the U.S. Fish and Wildlife Service (USFWS) Biological Opinion;
- All biological resource mitigation, monitoring, and compliance measures required in local agency permits, such as site grading and landscaping requirements;
- All sensitive biological resources to be impacted, avoided, or mitigated by Project construction, operation, and closure;
- All required mitigation measures for each sensitive biological resource;
- A detailed description of measures that will be taken to avoid or mitigate temporary disturbances from construction activities;
- All locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction;
- Aerial photographs, at an approved scale, of all areas to be disturbed during Project construction activities—one set prior to any site (and related facilities) mobilization disturbance and one set subsequent to completion of Project construction (planned timing of aerial photography and a description of why times were chosen included);
- Duration for each type of monitoring and a description of monitoring methodologies and frequency;
- Performance standards to be used to help decide if/when proposed mitigation is or is not successful;

-
- All performance standards and remedial measures to be implemented if performance standards are not met;
 - A preliminary discussion of biological resources-related facility closure measures; and
 - A process for proposing plan modifications to the CEC's Compliance Project Manager (CPM) and appropriate agencies for review and approval.

Table 3-1 describes relevant compliance plans and associated COC references, as well as other key measures including:

- BIO-5: Biological Resources Worker Environmental Awareness Program
- BIO-7: Impact Avoidance and Minimization Measures
- BIO-8: Pre-Construction Nest Surveys and Impact Avoidance and Minimization Measures for Migratory Birds
- BIO-9: Golden Eagle Territory-Specific Management Plan, if needed (Appendix C)
- BIO-11: Desert Tortoise Exclusion Fencing, Clearance Surveys and Translocation Plan (Appendix D)
- BIO-12: Mohave Ground Squirrel Clearance Surveys
- BIO-13: Burrowing Owl Mitigation Plan (Appendix E)
- BIO-14: American Badger and Desert Kit Fox Impact Avoidance and Minimization Measures
- BIO-15: Compensatory Mitigation
- BIO-16: Tamarisk Eradication, Monitoring, and Reporting Plan (Appendix F)
- BIO-17: Monitoring Impacts of Solar Collection Technology on Birds Study (Appendix G)
- BIO-18: Raven Monitoring, Management, and Control Plan (Appendix H)
- BIO-19: Evaporation Pond Monitoring and Adaptive Management Plan (Appendix I)
- BIO- 20: Harper Dry Lake Water Delivery
- USFWS Biological Opinion (Appendix J)

The BRMIMP includes accurate and up-to-date maps depicting the location of sensitive biological resources. See the included figures for maps showing the location of the following biological resources:

- Burrowing owl (Figure 4)
- Desert tortoise (Figure 5)
- Special-status plants (Figure 6)
- Special-status wildlife (Figure 7)

1.1.1 **Regulatory Approvals**

Table 1-1 lists the regulatory agencies and their respective approvals (e.g., conditions, permits, etc.) as they relate to biological resources for the Project.

**Table 1-1
Regulating Agency Approvals**

Agency	Approvals
CEC	Final Decision, which includes biological resources conditions of certification
California Department of Fish and Game	2080.1 Consistency Determination on Section 7 Endangered Species Act (ESA) Consultation or a 2081 Incidental Take Permit (requirements are incorporated into the Final Decision)
U.S. Department of Energy	NEPA Finding of No Significant Impact (Issuance of Federal Loan Guarantee).
Regional Water Quality Control Board	Waste Discharge Requirement (requirements are incorporated into the Final Decision)
U.S. Fish and Wildlife Service	Section 7 ESA Consultation--Biological Opinion (see Appendix J)

1.1.2 **BRMIMP Revisions**

The project owner shall notify the CPM no less than five working days before implementing any modifications to the approved BRMIMP to obtain CPM approval. Any changes to the approved BRMIMP must also be approved by the CPM in consultation with other appropriate agencies to ensure no conflict exists.

1.1.3 **BRMIMP Maintenance and Distribution**

Ultimately, the responsibility for maintaining the BRMIMP rests with Mojave Solar. During the construction phase of the Project, this task will be delegated to the DB. During Project operation,

the compliance staff at the Project site will be responsible for keeping the plan up to date. Current versions of the BRMIMP will be distributed to the following individuals (or their successors):

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1.2 PROJECT BACKGROUND

The Applicant proposes to develop approximately 1,765 acres for a 250-MW solar energy plant called Mojave Solar Project (MSP) (Figure 3). The Project will use parabolic trough solar thermal technology to produce electrical power, which uses a steam turbine generator fed from a solar steam generator (SSG). SSGs receive heat transfer fluid (HTF) from solar thermal equipment composed of arrays of parabolic mirrors that collect energy from the sun. This is based on the technology that has been successfully used for nearly 20 years at the nine existing Solar Energy Generating System facilities located at Harper Lake, Kramer Junction, and Daggett in the Mojave Desert. This technology involves a modular solar array field composed of many parallel rows of solar collectors normally aligned in a north-south horizontal axis. Each solar collector has a linear parabolic-shaped reflector that focuses the sun's radiation on a receiver located at the focal point of the parabola. The solar collectors track the sun from east to west during the day to ensure that the sun is continuously focused on the linear receiver. The linear receiver contains HTF, a synthetic oil that heats up to approximately 740 degrees Fahrenheit (°F) as it circulates through the receiver and returns to a series of heat exchangers where the HTF is used to generate steam that drives a turbine, which generates electrical power.

The Project will have a combined nominal electrical output of 250 MW from twin 125-MW power blocks. The power blocks will be joined to a transmission line to form one full-output transmission interconnection. Start of commercial operation is subject to timing of regulatory approvals and Applicant achievement of Project equipment procurement and construction milestones. The solar-thermal technology will provide 100 percent of the power generated by the plant; no supplementary energy source (e.g., natural gas to generate electricity at night) is proposed to be used for electric energy production. Each power block will have an auxiliary boiler fueled by natural gas to reduce startup time and for HTF freeze protection. The auxiliary boiler will supply steam to the HTF freeze protection heat exchangers as required during nighttime hours to keep the HTF in a liquid state when ambient temperatures are not sufficient to keep the HTF above its relatively high freezing point (54 degrees °F). Each power block will also have a diesel-fueled firewater pump for fire protection and a diesel-driven backup generator for power plant essentials.

The Project will connect to the Kramer-Coolwater 230-kilovolt transmission line owned by Southern California Edison (SCE) and located adjacent to the southern border of the Project. The Interconnection Facilities (IF) Study and Lockhart Substation Project Description detail the on-the-ground improvements associated with the proposed IF, which are located within the boundaries of the southern portion of the Project Area (Figure 3). SCE will lead the permitting effort for the transmission improvements past the Project-specific interconnection to the statewide system as a separate process. All Project-related transmission facilities are within the Project boundaries.

The Project proposes to use wet cooling towers for power plant cooling. Water for cooling tower makeup, process water makeup, and other industrial uses such as mirror washing will be supplied from on-site groundwater wells, which also will be used to supply water for employee use (e.g., drinking, showers, sinks, and toilets). A package water treatment system will be used to treat the water to meet potable standards. A sanitary septic system and on-site leach field will be used to dispose of sanitary wastewater.

Project cooling water blowdown will be piped to lined, on-site evaporation ponds in a common Project Area. The ponds will be sized to retain all solids generated during the life of the plant. However, if required for maintenance, dewatered residues from the ponds will be sent to an appropriate off-site landfill as nonhazardous waste. No off-site backup cooling water supply is planned at this time; the use of multiple on-site water supply wells and redundancy in the well equipment will provide an inherent backup in the event of outages affecting one of the on-site supply wells.

Natural gas for the Project's ancillary purposes will be supplied by a Southwest Gas Corporation-owned pipeline that runs parallel to the Project boundary. No off-site pipeline facilities are proposed as a part of this Project.

1.3 CONSTRUCTION SCHEDULE

The proposed construction schedule will occur over a period of 26 months and is anticipated to follow this approximate timeline:

- Preconstruction site mobilization: Spring 2011
- Begin construction: Summer 2011
- Initial startup and test: October 2013
- Full-scale commercial operation: December 2013 (subject to timing of regulatory approvals)

Upon completion of construction, the MSP is expected to operate for a minimum of 30 years. Therefore, the Proposed Action will cover a period of 32.75 years.

2.0 RESPONSIBLE PARTIES AND LINES OF COMMUNICATION

This section describes responsibilities of participating parties and key points of authority or notification during implementation of the Project (CEC 2010). For a complete listing of responsible parties, authority or notification actions, refer to Section 3.1.

Responsibilities of all participants in the Project are connected through the permitting/licensing process. Each participant, through legally binding instruments, agrees to abide by requirements designed to minimize impacts and document compliance to Federal and State laws that protect or conserve biological resources. Timely, clear, and effective communication between Mojave Solar, CEC, USFWS, CDFG, the construction contractor, and other agencies will be critical to the success of this Project.

2.1 CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER

In their role as State Lead Agency under the California Environmental Quality Act, CEC has the responsibility to complete an independent assessment of the Project's engineering design and its potential effects on the environment. The staff also recommends measures to mitigate potential significant adverse environmental effects, which take the form of COCs (Appendix A) for construction, operation, maintenance, and eventual decommissioning of the Project. The CPM is responsible for the designated actions, as discussed in Section 3.1. The name and contact information for the CPM is provided in Section 1.1.3, BRMIMP Maintenance and Distribution.

Key points of authority or notification are:

- The CPM will notify the MSP compliance project manager of a determination of success or failure of a corrective action within five working days after receipt of notice that corrective action is completed, or notify the MSP that coordination with other agencies would require additional time before such a determination could be made (BIO-4).

2.2 DEPARTMENT OF ENERGY AUTHORIZED OFFICER

In their role as Federal Lead Agency, the U.S. Department of Energy (DOE) has oversight responsibility to ensure the mitigation measures and conditions of approval contained in the Biological Opinion (BO) and Project Record of Decision (ROD) are implemented during Project construction, operation, and maintenance. Compliance will be monitored primarily by a

designated DOE Authorized Officer (AO), other DOE designate of the AO, and possibly a DOE Field Monitor. The names and contact information for DOE individuals are provided in Section 1.1.3, BRMIMP Maintenance and Distribution. DOE's AO is responsible for the designated actions shown in Table 3-1 and Appendix A.

2.3 MSP COMPLIANCE PROGRAM MANAGER

As the owner of the Project, Mojave Solar has the responsibility to construct, operate, and maintain the Project in compliance with all Federal, State, and local regulations, and in accordance with the CEC License. Mojave Solar will be responsible for ensuring that the DB or Biological Monitor (under the direction of the DB) communicates the conditions contained in the COCs and other permits to the construction contractors and operation and maintenance personnel and assists them in compliance matters. Mojave Solar retains final responsibility for compliance with environmental mitigation measures. Mojave Solar is responsible for the designated actions shown in Table 3-1 and Appendix A.

Key points of authority or notification are:

- In an emergency, Mojave Solar will immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent DB (see Section 2.3.3, MSP Designated Biologist) is proposed to the CPM for consideration (BIO-1).
- Mojave Solar will ensure the DB or Biological Monitor notifies the CPM of the circumstances and actions being taken to resolve the problem immediately (non-compliance problems) (BIO-4).
- If the non-compliance or halt to construction or operation relates to desert tortoise or any other federally listed or State-listed species, Mojave Solar will ensure the DB or Biological Monitor notifies both the USFWS and CDFG (BIO-4).

2.3.1 MSP Construction and/or Operations

The Engineering, Procurement, and Construction (EPC) Contractor for the Project is Abentey Mojave General Partnership. Several construction companies will work on-site. All of the construction contractors will be legally bound to the requirements of the COCs (Appendix A) and other permits through conditions included or otherwise incorporated into Project bid documents. The bid documents include text explaining that the contractor is accountable for their

actions on the affected environment. Compliance with environmental regulations will be a condition of employment. Operation staff and contractors will be legally bound to the requirements of the COCs (Appendix A) and other permits through conditions included or otherwise incorporated into MSP's operating contracts.

2.3.1.1 EPC Contractor Construction Manager

The EPC contractor construction manager will have ultimate oversight of the construction contractors to ensure compliance with the COCs (Appendix A).

Key points of authority or notification are:

- The construction/operation manager will act on the advice of the DB and Biological Monitors to ensure conformance with the biological resources of the COCs (BIO-4).
- During operations, employees will report any desert tortoise sightings, including along roadways, to the Biological Monitor (BIO-7, Item #8).

2.3.2 MSP Designated Biologist

The DB is responsible for the designated actions shown in Table 3-1 and Appendix A. The DB is the main contact for the CPM on matters related to biological resources. Although contracted by Mojave Solar, the DB will act independently and responsibly in verifying all elements of this BRMIMP or other approved mitigation are carried out in totality and in a timely manner. It is expected that the DB will be on-site during construction or otherwise available by phone.

Per COC BIO-2, the Project owner shall ensure that the DB performs the following duties during any site (or related facilities) mobilization, ground disturbance, grading, construction, operation, and closure activities. The DB may be assisted by the approved Biological Monitor(s), but remains the contact for the Project owner and CPM.

- Advise the Project owner's Construction and Operation Managers on the implementation of the biological resources conditions of certification.
- Consult on the preparation of the BRMIMP, to be submitted by the Project owner.
- Be available to supervise, conduct and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as special status species or their habitat.

Halt any and all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued or a violation of federal or state environmental laws or a violation of any environmental agreements/conditions made between the applicant and the CPM and/or the regulatory agencies.

- Clearly mark sensitive biological resource areas, if present and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions.
- Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (i.e. parking lots) for animals in harm's way.
- Respond directly to inquiries of the CPM regarding biological resource issues.
- Maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the Monthly Compliance Report and the Annual Report.
- Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training and all permits.

The Project owner's CPM-approved DB will submit the resume, at least three references and contact information, of the proposed Biological Monitors to the CPM, CDFG, and USFWS for approval (BIO-3). The DB will submit a written statement to the CPM confirming that the individual Biological Monitor(s) have been trained including the date when training was completed.

Key points of authority or notification are:

- The DB will halt any and all activities in any area when determined that an unauthorized adverse impact would occur to biological resources if the activities continued or a violation of Federal or State environmental laws or a violation of any environmental agreements/conditions made between the applicant and the CPM and/or the regulatory agencies would occur (BIO-2, BIO-4.)
- Inform Mojave Solar and the construction or operation manager when to resume activities (BIO-4, Item #2).

-
- Notify the CPM within 24 hours or the first business day following the weekend if the incident occurs on a Friday if there is a halt of any activities and advise the CPM of any corrective actions that have been taken or will be instituted as a result of the work stoppage.

2.3.2.1 Qualifications of the Designated Biologist

The DB must meet the following minimum qualifications:

1. Bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field;
2. 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;
3. Have at least one year of field experience with biological resources found in or near the Project area;
4. Meet the current USFWS Authorized Biologist qualifications criteria (www.fws.gov/ventura/speciesinfo/protocols_guidelines), demonstrate familiarity with protocols and guidelines for desert tortoise, and be approved by the USFWS;
5. Possess a California Endangered Species Act Memorandum of Understanding pursuant to CDFG Code Section 2081(a) for desert tortoise and Mohave ground squirrel; or
6. In lieu of the above requirements, the resume will demonstrate to the satisfaction of the CPM, in consultation with CDFG and USFWS, that the proposed DB or alternate has the appropriate training and background to effectively implement the COCs.

Resumes for the approved and alternate DBs and a list of references are provided in Appendix B. The contact information for the approved DB is provided in Section 1.1.3, BRMIMP Maintenance and Distribution.

2.3.3 MSP On-Site Biological Monitors

Biological Monitors are responsible for carrying out the actions assigned to them by the DB and reporting any variations to the DB.

Per BIO-3, the resume for each Biological Monitor shall demonstrate to the satisfaction of the

CPM, the appropriate education and experience to accomplish the assigned biological resource tasks, including:

- Biological Monitor(s) involved in any aspect of desert tortoise surveys or handling must meet the criteria to be considered a USFWS Authorized Biologist and demonstrate familiarity with the most recent protocols and guidelines for the desert tortoise.
- Biological Monitor(s) involved in any aspect of Mohave ground squirrel surveys or handling must possess a California ESA Memorandum of Understanding pursuant to Section 2081(a) for Mohave ground squirrel or have adequate experience and qualifications to obtain this authorizations.
- Biological Monitor(s) training by the DB shall include familiarity with the conditions of certification and the BRMIMP, WEAP, and all permits.
- The Biological Monitors shall assist the DB in conducting surveys and in monitoring of site mobilization activities, construction-related ground disturbance, grading, boring or trenching. The DB shall remain the contact for the Project owner and the CPM.

Key points of authority or notification are:

- If required by the DB and Biological Monitor(s), MSP's construction/operation manager will halt all site mobilization, ground disturbance, grading, boring, and trenching, and operation activities in areas specified by the DB (BIO-4).
- If the DB is unavailable for direct consultation, the Biological Monitor will act on behalf of the DB (BIO-4).
- The Biological Monitor will inform the DB, who will inform Mojave Solar if there is a halt of any activities and advise Mojave Solar of any corrective actions that have been taken, or will be instituted, as a result of the work stoppage (BIO-4).

2.4 REGULATORY AGENCY PERSONNEL

The CEC, USFWS, and CDFG, are responsible for enacting Federal and State laws concerning protection of biological resources. The agencies will aid the Project by being responsive to requests for guidance should the need arise. Agency representatives will monitor the success of the Project's compliance with Federal and State laws by monitoring reports prepared by the DB. Table 1-1 (above) lists the regulating agencies and the various instruments or agreements they

will grant or agreements they will enter into regarding the Project. The USFWS Biological Opinion is provided as Appendix J.

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3.0 COMPLIANCE MEASURES

3.1 SUMMARY OF COMPLIANCE MEASURES

3.1.1 Conditions of Certification

Table 3-1 provides a summary of compliance and mitigation measures identified by CEC in the COC. Biological resource impact avoidance, minimization, and mitigation measures proposed by the Applicant were provided in Section 5.3 the AFC (Mojave Solar 2009). These measures were then refined through the CEC data request and response process, as well as through input from the public workshops. Through this iterative process, the COCs presented in Table 3-1 were prepared by the CEC, and included in the Commission's Final Decision. Biological impacts have been minimized to the extent practical by siting facilities away from sensitive habitats, within disturbed areas, and adjacent to existing roads.

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**Table 3-1
BRMIMP Summary Table**

Condition ID	Description of Requirement	Verification	Responsible Party	Due Date
BIO-1	<p>DESIGNATED BIOLOGIST SELECTION AND QUALS.: The project owner shall assign a Designated Biologist to the project. The project owner shall submit the resume of the proposed Designated Biologist, with at least three references and contact information, to the California Energy Commission Compliance Project Manager (CPM), California Department of Fish and Game (CDFG), and U.S. Fish and Wildlife Service (USFWS) for approval. The Designated Biologist must meet the following minimum qualifications:</p> <ol style="list-style-type: none"> 1. Bachelor's Degree in biological sciences, zoology, botany, ecology, or a closely related field; and 2. 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; 3. At least one year of field experience with biological resources found in or near the project area; 4. Meet current USFWS Authorized Biologist criteria 32 and demonstrate familiarity with protocols and guidelines for the desert tortoise; and 5. Possess a recovery permit for desert tortoise and a California ESA Memorandum of Understanding pursuant to Section 2081(a) for desert tortoise and Mohave ground squirrel or have adequate experience and qualifications to obtain these authorizations. It is possible that two biologists may be utilized – each with an MOU for desert tortoise or MGS. <p>In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM, that the proposed Designated Biologist or alternate has the appropriate training and background to effectively implement the conditions of certification.</p>	<p>The project owner shall submit the specified information at least 60 days prior to the start of any pre-construction site mobilization. The CPM, CDFG, and USFWS have 30 days to approve or deny proposed Designated Biologist(s). No site or related facility activities shall commence until an approved Designated Biologist is available to be on site. If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to the CPM at least 10 working days prior to the termination or release of the preceding Designated Biologist. In an emergency, the project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to the CPM for consideration.</p>	Project Owner	At least 60 days prior to start of any pre-construction site mobilization.
BIO-2	<p>DESIGNATED BIOLOGIST DUTIES: The project owner shall ensure that the Designated Biologist performs the following during any site-related or facility activities. The Designated Biologist may be assisted by the approved Biological Monitors but remains the contact for project owner and the CPM.</p> <ol style="list-style-type: none"> 1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources conditions of certification; 2. Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), to be submitted by the project owner; 3. Be available to supervise, conduct and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as special status species or their habitat; 4. Halt any and all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued or a violation of federal or state environmental laws or a violation of any environmental agreements/conditions made between the applicant and the CPM and/or the regulatory agencies; 5. Clearly mark sensitive biological resource areas, if present and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions; 6. Inspect active construction areas where animals may have become trapped 	<p>The Designated Biologist shall submit in the Monthly Compliance Report to the CPM copies of all written reports and summaries that document biological resource compliance activities, including those conducted by Biological Monitors. If actions may affect biological resources during operation, a Designated Biologist or Biological Monitor under the supervision of the Designated Biologist shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless their duties are ceased as approved by the CPM. Monthly and Annual Compliance Reports shall be also be submitted to CDFG and USFWS.</p>	Project Owner & Designated Biologist	During construction include in MCR. During operations, summaries included in the ACR.

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	<p>prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (i.e., parking lots) for animals in harm's way;</p> <ol style="list-style-type: none"> 7. Notify the project owner and the CPM of any non-compliance with any biological resources condition of certification; 8. Respond directly to inquiries of the CPM regarding biological resource issues; 9. Maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the Monthly Compliance Report and the Annual Report; and 10. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training and all permits. 			
BIO-3	<p>BIOLOGICAL MONITOR SELECTION, QUALIFICATIONS, & DUTIES: The project owner's CPM-approved Designated Biologist shall submit the resume, and at least three references and contact information, of the proposed Biological Monitors to the CPM, CDFG, and USFWS for approval. The resume shall demonstrate to the satisfaction of the CPM, the appropriate education and experience to accomplish the assigned biological resource tasks, including:</p> <ul style="list-style-type: none"> • Biological Monitor(s) involved in any aspect of desert tortoise surveys or handling must meet the criteria to be considered a USFWS Authorized Biologist and demonstrate familiarity with the most recent protocols and guidelines for the desert tortoise. • Biological Monitor(s) involved in any aspect of Mohave ground squirrel surveys or handling must possess a California ESA Memorandum of Understanding pursuant to Section 2081(a) for Mohave ground squirrel or have adequate experience and qualifications to obtain this authorizations. • Biological Monitor(s) training by the Designated Biologist shall include familiarity with the conditions of certification and the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), Worker Environmental Awareness Program (WEAP), and all permits. • The Biological Monitors shall assist the Designated Biologist in conducting surveys and in monitoring of site mobilization activities, construction-related ground disturbance, grading, boring or trenching. The Designated Biologist shall remain the contact for the Project Owner, BLM's Authorized Officer and the CPM. 	<p>The project owner shall submit the specified information to the CPM, CDFG, and USFWS for approval at least 60 days prior to the start of any pre-construction site mobilization, and concurrent with the submittal of information required for the Designated Biologist approval process outlined in BIO-1. The CPM, CDFG, and USFWS have 30 days to approve or deny proposed Biological Monitor(s). The Designated Biologist shall submit a written statement to the CPM confirming that the individual Biological Monitor(s) have been trained including the date when training was completed. If additional biological monitors are needed during construction, the specified information shall be submitted to the CPM for approval 10 days prior to their first day of monitoring activities.</p>	Project Owner	At least 60 days prior to start of any pre-construction site mobilization.
BIO-4	<p>DESIGNATED BIOLOGIST AND BIOLOGICAL MONITOR AUTHORITY: The project owner's Construction/Operation Manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources COCs. If required by the Designated Biologist and Biological Monitor(s), project owner's construction/operation manager shall halt all site mobilization, ground disturbance, grading, boring, trenching, and operation activities in areas specified by the Designated Biologist. The Designated Biologist shall:</p> <ol style="list-style-type: none"> 1. Halt any and all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued or a violation of federal or state environmental laws or a violation of any environmental agreements/conditions made between the applicant and the CPM and/or the regulatory agencies; 2. Inform the project owner and the Construction/Operation Manager when to 	<p>The project owner shall ensure that the Designated Biologist or Biological Monitor notifies the CPM immediately (and no later than the following morning of the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, ground disturbance, grading, construction, and operation activities. The project owner shall notify the CPM of the circumstances and actions being taken to resolve the problem. Whenever corrective action is taken by the project owner, a determination of success or failure will be made by the CPM within five working days after receipt of notice that corrective action is completed, or the project owner will be notified by the CPM that coordination with other agencies will require additional time before a determination can be made.</p>	Project Owner, Designated Biologist, or Biological Monitor	As-needed. Immediate notification and no later than the morning following the incident, or Monday morning in the case of a weekend.

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	<p>resume activities; and</p> <ol style="list-style-type: none"> 3. Notify the CPM if there is a halt of any activities, and advise the CPM of any corrective actions that have been taken, or will be instituted, as a result of the work stoppage. 4. If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist. It is expected that the Designated Biologist will be onsite during construction or otherwise available by phone. 			
BIO-5	<p>WEAP: The project owner shall develop and implement a CPM-approved WEAP in which each of its employees, as well as employees of contractors and subcontractors who work on the project site or any related facilities during site mobilization, ground disturbance, grading, construction, operation, and closure are informed about sensitive biological resources associated with the project. The WEAP must:</p> <ol style="list-style-type: none"> 1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material and electronic media is made available to all participants; 2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas, if present; 3. Present the reasons for protecting these resources; 4. Present the meaning of various temporary and permanent habitat protection measures as necessary; 5. Discuss penalties for violation of applicable LORS (e.g., federal and state endangered species acts); 6. Identify whom to contact if there are further comments and questions about the material discussed in the program; and 7. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines. <p>The specific program can be administered by a competent individual(s) acceptable to the Designated Biologist.</p>	<p>At least 45 days prior to the start of any pre-construction site mobilization, the project owner shall provide to the CPM the proposed WEAP and all supporting written materials and electronic media prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program. The CPM shall review and provide written comments within 15 days of receipt of the WEAP. The project owner shall provide in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date. At least 10 days prior to site and related facilities mobilization submit two copies of the CPM-approved materials. Training acknowledgement forms signed during construction shall be kept on file by the project owner for a period of at least 6 months after the start of commercial operation. During project operation, signed statements for operational personnel shall be kept on file for 6 months following the termination of an individual's employment.</p>	Project Owner & Designated Biologist	<p>Precon: At least 45 days prior to any pre-construction site mobilization</p> <p>Construction, Operations and Closure: Administer training within 1 week of arrival to any new personnel.</p> <p>Construction: File training acknowledgement forms at least 6 months after the start of commercial operation.</p> <p>Operation: File signed training acknowledgement forms for 6 months following termination of an individual's employment.</p>
BIO-6	<p>BRMIMP: The project owner shall develop a BRMIMP and submit two copies of the proposed BRMIMP to the CPM (for review and approval) and to CDFG and USFWS (for review and comment) if applicable and shall implement the measures identified in the approved BRMIMP. A copy of the BRMIMP shall be kept onsite and made readily available to biologists, regulatory agencies, the project owner, contractors, and subcontractors as needed. The BRMIMP shall be prepared in consultation with the Designated Biologist and shall identify:</p> <ol style="list-style-type: none"> 1. All biological resource mitigation, monitoring, and compliance measures proposed and agreed to by the project owner; 2. All applicant-proposed mitigation measures presented in the Application for Certification, data request responses, and workshop responses; 3. All biological resource conditions of certification identified as necessary to avoid or mitigate impacts; 4. All biological resource mitigation, monitoring, and compliance measures required in federal agency terms and conditions, such as those provided in the Biological Opinion; 5. All biological resource mitigation, monitoring, and compliance measures required in local agency permits, such as site grading and landscaping requirements; 6. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation, and closure; 7. All required mitigation measures for each sensitive biological resource; 	<p>The project owner shall provide the specified document at least 45 days prior to start of any pre-construction site mobilization. The CPM, in consultation with other appropriate agencies, will determine the BRMIMP's acceptability within 30 days of receipt. If there are any permits that have not yet been received when the BRMIMP is first submitted, these permits shall be submitted to the CPM within 5 days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit condition within 10 days of their receipt by the project owner. Ten days prior to pre-construction site mobilization the revised BRMIMP shall be resubmitted to the CPM. Site mobilization will not occur without an approved BRMIMP. The project owner shall notify the CPM no less than five working days before implementing any modifications to the approved BRMIMP to obtain CPM approval. Any changes to the approved BRMIMP must also be approved by the CPM in consultation with other appropriate agencies to ensure no conflicts exist. Implementation of BRMIMP measures will be reported in the Monthly Compliance Reports by the Designated Biologist (i.e., survey results, construction activities that were monitored, species observed). Within 30</p>	Project Owner & Designated Biologist	<p>Draft BRMIMP at least 45 days prior to construction-related ground disturbance. Permits shall be submitted within 5 days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit condition with 10 days of their receipt.</p>

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BIO-6 (Contd.)	<p>8. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;</p> <p>9. All locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction;</p> <p>10. Aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities — one set prior to any site (and related facilities) mobilization disturbance and one set subsequent to completion of project construction. Include planned timing of aerial photography and a description of why times were chosen;</p> <p>11. Duration for each type of monitoring and a description of monitoring methodologies and frequency;</p> <p>12. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;</p> <p>13. All performance standards and remedial measures to be implemented if performance standards are not met;</p> <p>14. A preliminary discussion of biological resources-related facility closure measures; and</p> <p>15. A process for proposing plan modifications to the CPM and appropriate agencies for review and approval.</p>	<p>days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction closure report identifying which items of the BRMIMP have been completed, a summary of all modifications to mitigation measures made during the project's site mobilization, ground disturbance, grading, and construction phases, and which mitigation and monitoring items are still outstanding.</p>		
BIO-7	<p>The project owner shall implement the following measures during construction and operation to manage their project site and related facilities in a manner to avoid or minimize impacts to the local biological resources:</p> <p>1. LIMIT DISTURBANCE AREAS: The boundaries of all areas to be temporarily or permanently disturbed (including staging areas, access roads, and sites for temporary placement of spoils) shall be delineated with stakes and flagging prior to construction activities in consultation with the Designated Biologist. Spoils shall be stockpiled in disturbed areas, which do not provide habitat for special status species. Parking areas, staging, and disposal site locations shall similarly be located in areas without native vegetation or special-status species habitat. All disturbances, vehicles, and equipment shall be confined to the flagged areas.</p> <p>2. MINIMIZE ROAD IMPACTS: New and existing roads that are planned for construction, widening, or other improvements shall not extend beyond the flagged impact area. All vehicles passing or turning around would do so within the planned impact area or in previously disturbed areas. Where new access is required outside of existing roads (e.g. new spur roads) or the construction zone, the route will be clearly marked (i.e., flagged and/or staked) prior to the onset of construction.</p> <p>3. MINIMIZE TRAFFIC IMPACTS: Vehicular traffic during Project construction and operation shall be confined to existing routes of travel to and from the Project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit shall not exceed 25 miles per hour on Harper Lake Road and within fenced areas that have been cleared of tortoises and other wildlife. The speed limit shall not exceed 15 miles per hour within unfenced areas and secondary unpaved access roads.</p> <p>4. MONITOR DURING CONSTRUCTION: The Designated Biologist or Biological Monitor shall be present at the construction site during all project activities that have potential to disturb soil, vegetation, and wildlife. The USFWS-approved Designated Biologist or Biological Monitor shall closely monitor vegetation removal and grading activities to prevent wildlife injury or mortality.</p>	<p>All mitigation measures and their implementation methods shall be included in the BRMIMP. Implementation of the measures will be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction termination report identifying how measures have been completed. Additional copies shall be provided to CDFG and USFWS.</p>	<p>Project Owner, Designated Biologist, and/or Biological Monitor</p>	<p>Ongoing</p>

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BIO-7 (Contd.)	<p>5. MINIMIZE IMPACTS OF TRANSMISSION/PIPELINE ALIGNMENTS, ROADS, AND STAGING AREAS: Staging areas for construction on the plant site shall be within the area that has been fenced with DT exclusion fencing and cleared. Temporary disturbance areas, if necessary, shall occur within the project site and shall be designed, installed, and maintained with the goal of minimizing disturbance. Transmission lines and all electrical components shall be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) Suggested Practices for Avian Protection on Power Lines (APLIC 2006) and Mitigating Bird Collisions with Power Lines (APLIC 2004) to reduce the likelihood of bird electrocutions and collisions.</p> <p>6. AVOID USE of TOXIC SUBSTANCES: Road surfacing and sealants as well as soil bonding and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants.</p> <p>7. MINIMIZE LIGHTING IMPACTS: Facility lighting shall be designed, installed, and maintained to prevent side casting of light towards the project boundaries and the Harper Dry Lake marsh. Lighting shall be shielded, directional, and at the lowest intensity required for activity.</p> <p>8. AVOID VEHICLE IMPACTS TO DESERT TORTOISE: Parking and storage shall occur within DT exclusion fencing to the extent feasible. No vehicles or construction equipment parked outside the fenced area shall be moved prior to an inspection of the ground beneath the vehicle for the presence of DT. During construction, a Biological Monitor shall drive along project access roads, particularly Harper Lake Road at least every three hours during the DT active period (April through May and September through October) looking for DT or other vulnerable wildlife within the roadway. Outside of the active period, roads shall be monitored at least twice a day in advance of peak AM and PM traffic periods. During operation, employees shall report any DT sightings along roadways to the Biological Monitor. If a DT is observed in the roadway or beneath a parked vehicle, it will be left to move on its own or a Biological Monitor may remove and transfer the animal to a safe location if temperatures are within the appropriate range as identified in the Final Desert Tortoise Clearing and Translocation Plan.</p> <p>9. AVOID WILDLIFE PITFALLS: At the end of each workday the DB shall ensure that all potential wildlife pitfalls (trenches, bores, and other excavations) outside of the permanently fenced areas have been backfilled. If backfilling is not feasible, all trenches, bores, and other excavations shall be slope at 3:1 ratio at the ends to provide escape ramps, or covered completely to prevent wildlife access, or fully enclosed with tortoise-exclusion fencing. All trenches, bores, and other excavations outside the areas fenced with DT exclusion fencing shall be inspected at the beginning of each workday, periodically throughout, and at the end of each workday by the Designated Biologist. Should a tortoise or other wildlife become trapped, the Designated Biologist or Biological Monitor shall remove and relocate the individual to a safe location. Any wildlife encountered during the course of construction shall be allowed to leave the construction area unharmed.</p> <p>10. AVOID ENTRAPMENT OF WILDLIFE: Any construction pipe, culvert, or similar structure with a diameter greater than three inches, stored less than eight inches above ground for one or more days/nights, shall be inspected for wildlife before the material is moved, buried, or capped. As an alternative, all such structures may be capped before being stored, or placed on pipe racks.</p>			

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BIO-7 (Contd.)	<p>11. REPORT WILDLIFE INJURY and MORTALITY: Report all inadvertent deaths of sensitive species to the appropriate project representative, including road kill. Species name, physical characteristics of the animal (sex, age class, length, weight), and other pertinent information shall be noted and reported in the MCRs. Injured animals shall be reported to the CDFG or USFWS and the CPM and the project owner shall follow instructions that are provided by CDFG or USFWS. If CDFG or USFWS cannot be immediately reached, consideration should be given to taking the animal to a veterinary hospital. If any golden eagles area recovered dead, they shall be sent to the National Eagle Repository after the cause of death has been investigated.</p> <p>12. MINIMIZE STANDING WATER: Water applied to dirt roads and construction areas (trenches or spoil piles) for dust abatement shall use the minimal amount needed to meet safety and air quality standards in an effort to prevent the formation of puddles, which could attract DT and common ravens, and other wildlife to construction sites. A Biological Monitor shall patrol these areas to ensure water does not puddle and attract DT, common ravens, and other wildlife to the site and shall take appropriate action to reduce water application where necessary.</p> <p>13. MINIMIZE HAZARDOUS MATERIALS SPILLS: All vehicles and equipment shall be maintained in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The Designated Biologist shall be informed of any hazardous spills immediately as directed in the Project Hazardous Materials Plan. Hazardous spills shall be immediately cleaned up and the contaminated soil properly disposed of at a licensed facility. Servicing of construction equipment shall take place only at a designated area. Service/maintenance vehicles shall carry a bucket and pads to absorb leaks or spills.</p> <p>14. WORKER GUIDELINES: During construction all trash and food-related waste shall be placed in self-closing containers and removed weekly from the site. Workers shall not feed wildlife or bring pets to the Project site. Except for law enforcement personnel, no workers or visitors to the site shall bring firearms or weapons.</p> <p>15. AVOID SPREAD OF NOXIOUS WEEDS: The project owner shall implement the following Best Management Practices during construction and operation to prevent the spread and propagation of noxious weeds:</p> <ul style="list-style-type: none"> A. Limit the size of any vegetation and/or ground disturbance to the absolute minimum and limit ingress and egress to defined routes; B. Reestablish vegetation quickly on temporarily disturbed areas, including pipelines, transmission lines, and staging areas (BIO-9); C. Prevent the spread of non-native plants via vehicular sources by implementing Trackclean™ or other method of vehicle cleaning for vehicles coming and going from construction sites. Earth-moving equipment and construction vehicles shall be cleaned within an approved area or commercial facility prior to transport to the construction site. The number of cleaning stations shall be limited and weed control/herbicide application shall be used at the cleaning station(s); D. Use only weed-free straw, hay bales, and seed for erosion control and sediment barrier installations; E. Invasive non-native species shall not be used in landscaping plans and erosion control; and, F. Monitor and rapidly implement control measures to ensure early detection and eradication of weed invasions. 			

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BIO-7 (Contd.)	<p>16. IMPLEMENT EROSION CONTROL MEASURES: Standard erosion control measures shall be implemented for all phases of construction and operation. All disturbed soils and roads within the project site shall be stabilized to reduce erosion potential, both during and following construction. Areas of disturbed soils (access and staging areas) with slopes toward an ephemeral drainage or Harper Dry Lake shall be stabilized to reduce erosion potential.</p> <p>17. MONITOR GROUND-DISTURBING ACTIVITIES PRIOR TO SITE MOBILIZATION: If ground-disturbing activities are required prior to site mobilization, such as for geotechnical borings or hazardous waste evaluations, a Designated Biologist or Biological Monitor shall be present to monitor any actions that could disturb soil, vegetation, or wildlife. Actions not included in the project description are prohibited.</p>			
BIO-8	<p>PRE-CONSTRUCTION NEST SURVEYS AND IMPACT AVOIDANCE AND MINIMIZATION MEASURES FOR MIGRATORY BIRD: Pre-construction nest surveys shall be conducted if construction activities will occur from February 1 through August 1. At all times of the year, noise generating activities shall be limited during early morning and evening to avoid impacts to birds protected under the Migratory Bird Treaty Act. The Designated Biologist or Biological Monitor shall perform surveys in accordance with the following guidelines:</p> <ol style="list-style-type: none"> 1. Surveys shall cover all potential nesting habitat in the project site and within 500 feet of the boundaries of the plant site as well as any areas potentially exposed to noise levels above 60 dBA; 2. At least two pre-construction surveys shall be conducted, separated by a minimum 10-day interval. One of the surveys needs to be conducted within the 10-day period preceding initiation of construction activity. Additional follow-up surveys may be required if periods of construction inactivity exceed three weeks in any given area, an interval during which birds may establish a nesting territory and initiate egg laying and incubation; 3. If active nests are detected during the survey, a no-disturbance buffer zone (protected area surrounding the nest, the size of which is to be determined by the Designated Biologist in consultation with CDFG and USFWS) and monitoring plan shall be developed. Nest locations shall be mapped using GPS technology and submitted, along with a weekly report stating the survey results, to the CPM; and 4. The Designated Biologist or Biological Monitor shall monitor the nest until he or she determines that nestlings have fledged and dispersed; activities that might, in the opinion of the Designated Biologist in consultation with the CPM, disturb nesting activities (e.g., excessive noise above 60 dBA), shall be prohibited within the buffer zone until such a determination is made. 	At least 10 days prior to the start of any pre-construction site-mobilization, the project owner shall provide the CPM a letter-report describing the findings of the pre-construction nest surveys, including the time, date, and duration of the survey; identity and qualifications of the surveyor(s); and a list of species observed. If active nests are detected during the survey, the report shall include a map or aerial photo identifying the location of the nest and shall depict the boundaries of the no-disturbance buffer zone around the nest. Additional copies shall be provided to CDFG and USFWS.	Project Owner, Designated Biologist & Biological Monitor	If construction is to occur from February 1 through August 1, prior to start of pre-construction site mobilization.
BIO-9	<p>GOLDEN EAGLE TERRITORY - SPECIFIC MANAGEMENT PLAN: In addition to the breeding season golden eagle inventory conducted in the spring of 2010, a non-breeding season golden eagle inventory survey shall be conducted in late summer/early winter. If an occupied golden eagle territory is identified within 10 miles of the project site (except for the territory identified at Black Mountain in April 2010) during breeding or non-breeding inventory surveys for the MSP, the project owner shall prepare and implement a Golden Eagle Territory-Specific Management Plan. This plan shall:</p> <ol style="list-style-type: none"> 1. Include measures to avoid and minimize disturbance (as defined in 50 CFR 22.3) to golden eagles during project construction and operation activities. Measures may include limited operating periods or no-disturbance buffers within which certain potentially disruptive project activities shall not be conducted, or 	The project owner shall submit a report to the CPM, CDFG, and USFWS within 30 days of completion of breeding-season golden eagle surveys. This report shall document the results of the inventory and monitoring as described in Pagel et al. 2010. The project owner shall submit a report to the CPM, CDFG, and USFWS within 30 days of completion of non-breeding season golden eagle surveys. This report shall document the results of the protocol surveys as described in Pagel et al. 2010 or more recent guidance by USFWS (e.g., Pagel et al, in prep). At least 30 days prior to the start of any pre-construction site mobilization, the project owner shall provide the CPM, CDFG, and USFWS with the final version of the Golden Eagle Territory-Specific Management Plan,	Project Owner	<p>Survey report within 30 days of completion of breeding and non-breeding surveys.</p> <p>Submit the final version of the Golden Eagle Territory-Specific Management Plan at least 30 days prior to the start of any pre-construction site mobilization.</p>

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BIO-9 (Contd.)	modification of certain project activities to reduce the potential for disturbance to eagles. 2. Identify monitoring actions and schedule for their implementation to ensure avoidance and minimization of disturbance. Monitoring and reporting shall be conducted pre- and post activity per Interim Golden Eagle Inventory and Monitoring Protocols (Pagel et al. 2010).	based on breeding-season inventory results. This final Plan shall have been reviewed and approved by the CPM in consultation with USFWS. If disturbance to eagles would not occur and a Plan is not warranted, a letter from USFWS documenting this determination shall be submitted to the CPM at least 10 days prior to the start of any pre-construction site mobilization. An addendum to the Plan may be required by USFWS based on non-breeding season survey results. If required, a final addendum, which has been reviewed and approved by the CPM in consultation with USFWS, shall be submitted to the CPM within 90 days of completion of non-breeding season golden eagle surveys.		
BIO-10	DOCUMENTATION OF BALD AND GOLDEN EAGLE ACT COMPLIANCE: The project owner shall provide documentation to the CPM that the project is in compliance with the Bald and Golden Eagle Protection Act (Title 16, United States Code, sections 668-668d).	No less than 10 days prior to the start of any pre-construction site mobilization, the project owner shall submit to the CPM documentation that the project is in compliance with the Bald and Golden Eagle Protection Act (Title 16, United States Code, sections 668-668d). This shall include documentation from the USFWS in the form of written or electronic transmittal indicating the status of the permit, if required, and any follow-up actions required by the project owner. Any additional actions shall be added to the BRMIMP and implemented.	Project Owner	No less than 10 days prior to the start of any pre-construction site mobilization.
BIO-11	DESERT TORTOISE EXCLUSION FENCING, CLEARANCE SURVEYS, AND TRANSLOCATION PLAN: A DT Exclusion Fencing, Clearance Surveys, and Translocation Plan (DT Plan) shall be developed in consultation with the CPM, CDFG, and USFWS. This plan shall include detailed measures to avoid and minimize impacts to DT in and near the construction areas as well as methods for clearance surveys, fence installation, tortoise handling,; artificial burrow construction, egg handling, and other procedures, which shall be consistent with those described in the USFWS DT Field Manual or more current guidance provided by CDFG and USFWS. At a minimum, the following measures shall be included in the plan and implemented by the project owner to manage their construction site, and related facilities, in a manner to avoid, minimize, or mitigate impacts to DT. 1. FENCE INSTALLATION: Prior to ground disturbance, the entire project site shall be fenced with DT exclusion fence. To avoid impacts to DT during fence construction, the proposed fence alignment shall be flagged and the alignment surveyed within 24 hours prior to fence construction. Surveys shall be conducted by the Designated Biologist using techniques approved by the USFWS and CDFG. Biological Monitors may assist the Designated Biologist under his or her supervision. These surveys shall provide 100% coverage of all areas to be disturbed during fence construction and an additional transect along both sides of the fence line. This fence line transect shall cover an area approximately 90 feet wide centered on the fence alignment. Transects shall be no greater than 30 feet apart. All DT burrows, and burrows constructed by other species that might be used by DTs, shall be examined to assess occupancy with USFWS approved protocol.	At least 45 days prior to the start of any pre-construction site mobilization, the project owner shall provide the CPM with the final version of the Desert Tortoise Translocation Plan that has been approved by Energy Commission staff, USFWS, and CDFG. The CPM will determine the plan's acceptability within 15 working days of receipt of the final plan. All modifications to the approved final Desert Tortoise Translocation Plan must be made only after approval by the Energy Commission staff, USFWS, and CDFG. The project owner shall notify the CPM no fewer than five working days before implementing any CPM-approved modifications to the Translocation Plan. Within 30 days of completing of desert tortoise clearance surveys the Designated Biologist shall submit a report to the CPM, USFWS, and CDFG describing how each of the mitigation measures have been satisfied. The report shall include the desert tortoise survey results, capture and release locations of any translocated desert tortoises, and any other information needed to demonstrate compliance with the measures described above.	Project Owner, Designated Biologist & Biological Monitor	Submit Final Desert Tortoise Translocation Plan at least 45 days prior to the start of any pre-construction site mobilization. Submit report within 30 days of completing of desert tortoise clearance surveys.

Condition ID	Description of Requirement	Verification	Responsible Party	Due Date
<p>BIO-11 (Contd.)</p>	<p>A. Timing, Supervision of Fence Installation. The exclusion fencing shall be installed in any area subject to disturbance prior to the onset of site clearing and grubbing in that area. The fence installation shall be supervised by the Designated Biologist and monitored by the Biological Monitors to ensure the safety of any tortoise present.</p> <p>B. Fence Material and Installation. The permanent tortoise exclusionary fencing shall consist of galvanized hard wire cloth, 1- by - inch mesh sunk 12 inches into the ground, and 24 inches above ground (refer to parameters for USFWS-approved tortoise exclusion fencing at www.fws.gov/ventura/speciesinfo/protocols_guidelines). For temporary exclusion fencing, a "folded bottom" technique shall be implemented. This method follows the same guidelines as installation of permanent fencing except instead of burying the bottom 12 inches of fencing, it is bent at an approximately 90-degree angle (to follow the contour of the ground) and spikes or other retaining methods are driven into the ground every two linear feet in such a manner as to "anchor" the bottom of the fence. This method eliminates the need for trenching, which for short-term temporary impacts may be more beneficial to the recovery of the landscape, and thus the species.</p> <p>C. Security Gates. Security gates shall be designed with minimal ground clearance to deter ingress by tortoises. The gates shall remain closed except during vehicle passage and may be electronically activated to open and close immediately after the vehicle(s) have entered or exited to prevent extended periods with open gates, which might lead to a tortoise entering.</p> <p>D. Storm water Drainage Fencing. The onsite storm water drainage channels, including the headwalls, outlet, and road crossings, shall be permanently fenced to ensure exclusion of DT during MSP operation.</p> <p>E. Fence Inspections. Following installation of the DT exclusion fencing for the permanent site and the storm water drainage fencing and temporary fencing (if required), the fencing shall be regularly inspected. Permanent fencing shall be inspected monthly and during/immediately following all major rainfall events. Any damage to the fencing shall be temporarily repaired immediately to keep tortoises out of the site, and permanently repaired within two days of observing damage. Inspections of permanent site fencing shall occur for the life of the Project. Temporary fencing must be inspected immediately following major rainfall events. All temporary fencing shall be repaired immediately upon discovery and, if the fence may have permitted tortoise entry while damaged, the Designated Biologist shall inspect the area enclosed by the fence for tortoise.</p> <p>2. DESERT TORTOISE CLEARANCE SURVEYS: Following construction of the tortoise exclusionary fencing around the Plant site, all fenced areas shall be cleared of tortoises by the Designated Biologist, who may be assisted by Biological Monitors. A minimum of two 100 percent coverage protocol clearance surveys with negative results must be completed and these must coincide with heightened desert tortoise activity from April through May and September through October. Non-protocol clearance surveys may be conducted in areas of certainly unsuitable habitat (e.g., developed) with prior approval of specific areas by USFWS and CDFG (these proposed areas shall be identified in the Desert Tortoise Plan). Clearance survey transects shall be followed as described in the Final Desert Tortoise Plan. Additional clearance survey guidelines are provided in the USFWS <i>Desert Tortoise Field Manual</i> (www.fws.gov/ventura/speciesinfo/protocols_guidelines).</p>			

Condition ID	Description of Requirement	Verification	Responsible Party	Due Date
BIO-11 (Contd.)	<p>Translocation Of Desert Tortoise: If DT are detected during clearance surveys within the project impact area, the Designated Biologist shall safely translocate the tortoise the shortest possible distance to the nearest suitable habitat. Any handling efforts shall be in accordance with techniques described in the final Desert Tortoise Plan., which shall be consistent with the USFWS <i>Desert Tortoise Field Manual</i> (www.fws.gov/ventura/speciesinfo/protocols_guidlines). If a visibly diseased tortoise is encountered onsite, procedures shall be implemented in accordance with the approved final Desert Tortoise Plan.</p> <p>3. BURROW INSPECTION: All potential DT burrows within the fenced area shall be searched for presence. To prevent reentry by a tortoise or other wildlife, all burrows shall be collapsed once absence has been determined, in accordance with the final DT Plan. Immediately following excavation and if environmental conditions warrant immediate translocation, tortoises excavated from burrows shall be translocated to unoccupied natural or artificial burrows within the location approved by USFWS and CDFG per the final DT Plan.</p> <p>4. BURROW EXCAVATION: Burrows inhabited by tortoise shall be excavated by the Designated Biologist using hand tools, and then collapsed or blocked to prevent re-occupation, in accordance with the final DT Plan. If excavated during May through July, the Designated Biologist shall search for DT nest/eggs. All DT handling and removal, and burrow excavation, including nest, shall be conducted by the Designated Biologist in accordance with the USFWS <i>Desert Tortoise Field Manual</i> (www.fws.gov/Ventura/speciesinfo/protocols_guidlines).</p> <p>5. MONITORING DURING CLEARING: Following the installation of exclusionary fencing and after ensuring desert tortoise are absent from the project site, heavy equipment shall be allowed to enter the project site to perform earthwork such as clearing, grubbing, leveling, and trenching. A Biological Monitor shall be on site at all times during initial clearing and grading activities. Should a tortoise be discovered, it shall be relocated as described above in accordance with the final DT Plan.</p> <p>6. REPORTING: The Designated Biologist shall record the following information for any DT handled: a) the locations (narrative and maps) and dates of observation; b) general condition and health, including injuries, state of healing and whether DT voided their bladders; c) location moved from and location moved to (using GPS technology); d) gender, carapace length, and diagnostic markings (i.e., identification numbers or marked lateral scutes); e) ambient temperature when handled and released; and f) digital photograph of each handled DT. DT moved from within Project areas shall be marked and monitored in accordance with the Desert Tortoise Relocation/Translocation Plan. Digital photographs of the carapace, plastron, and fourth scute shall be taken. Scutes shall not be notched for identification.</p>			

Condition ID	Description of Requirement	Verification	Responsible Party	Due Date
BIO-12	<p>MOHAVE GROUND SQUIRREL CLEARANCE SURVEYS: The project owner shall implement the following measure to manage their construction site, and related facilities, in a manner to avoid or minimize impacts to Mohave ground squirrels (MGS).</p> <p>1. CLEARANCE SURVEY: After the installation of the DT exclusion fence and immediately prior to any ground disturbance, the Designated Biologist shall examine the construction disturbance area for MGS and their burrows. The survey shall provide 100 percent coverage of suitable habitat within the project site (undisturbed desert saltbush scrub, disturbed desert saltbush scrub, disturbed desert saltbush scrub re-growth, fallow agriculture- saltbush regrowth.</p> <p>A. If potentially occupied burrows are identified, an attempt shall be made to trap and relocate the individual(s). Potentially occupied burrows shall be fully excavated by hand.</p> <p>B. Trapping, relocation, and MGS burrow excavation shall only be conducted by individual(s) possessing and Memorandum of Understanding (MOU) with CDFG for such activities.</p> <p>2. RECORDS of CAPTURE. If MGS are captured via trapping or burrow excavation, the Designated Biologist shall maintain a record of each MGS handled, including: a) the locations (Global Positioning System [GPS] coordinates and maps) and time of capture and/or observation as well as release; b) sex; c) approximate age (adult/juveniles); d) weight; e) general condition and health, noting all visible conditions including gait and behavior, diarrhea, emaciation, salivation, hair loss, ectoparasites, and injuries; and f) ambient temperature when handled and released.</p> <p>3. RELOCATION. Any MGS captured via trapping or burrow excavation shall be relocated to suitable habitat adjacent to the project site, which provides conditions suitable for the long-term survival of relocated MGS.</p>	<p>The Designated Biologist shall submit a report to the CPM and CDFG documenting results of the clearance surveys and records of capture of MGS if applicable. The report is required within 30 days of completion of the MGS clearance surveys.</p>	<p>Project Owner, Designated Biologist & Biological Monitor</p>	<p>Prior to ground disturbance activities and after DT exclusion fencing has been installed. Report with within 30 days of completion of the MGS clearance surveys.</p>
BIO-13	<p>BURROWING OWL IMPACT AVOIDANCE, MINIMIZATION, AND COMPENSATION MEASURES: Prior to preconstruction surveys, a Burrowing Owl Monitoring and Mitigation Plan (Burrowing Owl Plan) shall be developed by the project owner in consultation with the CPM and CDFG. This plan shall include detailed measures to avoid and minimize impacts to burrowing owls in and near the construction areas (if identified during surveys) and shall be consistent with CDFG guidance (CDFG 1995). In addition, the plan shall identify the optimal time to concurrently relocate both desert tortoise and burrowing owl. At a minimum, the following measures shall be included in the plan and implemented by the project owner to manage their construction site, and related facilities, in a manner to avoid, minimize, or mitigate impacts to breeding and foraging burrowing owls.</p> <p>1. PRE-CONSTRUCTION SURVEYS. The Designated Biologist shall conduct pre-construction surveys for burrowing owls within the project site and a 160-foot buffer. These surveys shall be conducted concurrent with the DT clearance surveys, to the maximum extent possible. Pre-construction surveys shall be conducted prior to the nesting season (February 1 through August 31) and all burrowing owls will be passively relocated using one-way trap doors. Once the Designated Biologist has verified that all burrowing owls have vacated an occupied burrow, the Designated Biologist shall collapse the burrow, preventing re-occupation.</p> <p>A. If ground disturbance cannot be avoided in areas where nesting burrowing owls are active, a 250-foot exclusion area around occupied burrows will be flagged and this area will not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist verifies through non-invasive methods that either; (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival. The exclusion area shall remain connected to natural area(s)</p>	<p>At least 45 days prior to start of any pre-construction site mobilization, the project owner shall provide the CPM and CDFG with the final version of the Burrowing Owl Monitoring and Mitigation Plan that has been reviewed and approved by the CPM in consultation with CDFG. An addendum to the plan, which includes the pre-construction survey results, (e.g., number of owls identified onsite) and the CDFG-approved amount of compensatory mitigation, shall be submitted within 10 days of completing the burrowing owl pre-construction surveys. The CPM will determine the acceptability of the Plan and addendum within 15 days of their receipt. All modifications to the approved Plan may be made by the CPM after consultation with CDFG. The project owner shall notify the CPM no less than five working days before implementing any CPM-approved modifications to the Burrowing Owl Monitoring and Mitigation Plan.</p>	<p>Designated Biologist & Biological Monitor</p>	<p>Pre-construction surveys concurrent with DT clearance surveys.</p> <p>Pre-construction survey results, (e.g., number of owls identified onsite) and the CDFG-approved amount of compensatory mitigation shall be submitted within 10 days of completing the burrowing owl pre-construction surveys.</p> <p>Burrow installation prior to ground disturbance activities.</p> <p>Passive relocation surveys will be conducted for two years with surveys occurring in the spring and in the winter.</p>

Condition ID	Description of Requirement	Verification	Responsible Party	Due Date
<p>BIO-13 (Contd.)</p>	<p>to the extent possible, to avoid completely surrounding the owl with construction activities and/or equipment.</p> <p>2. ARTIFICIAL BURROW INSTALLATION. Prior to any ground-disturbing activities, the project owner shall install five artificial burrows for each identified BO burrow within the project area that would be destroyed, within the approved compensatory habitat area. The Designated Biologist shall survey the site selected for artificial burrow construction to verify that such construction will not affect DT or MGS or existing BO colonies in the relocation area. Installation of the artificial burrows shall occur after baseline surveys of the relocation area and prior to ground disturbance or heavy equipment staging. Design of the artificial burrows shall be consistent with CDFG guidelines and shall be approved by the CPM in consultation with CDFG.</p> <p>3. PASSIVE RELOCATION. Prior to passive relocation, any owl that will be relocated shall be color banded with air-craft aluminum bands in accordance with the guidance provided by USGS bird banding lad to monitor relocation success. Color banding shall not be conducted during ht breeding season. During the non-breeding season, owls would be given a minimum of three weeks to become familiar with the new artificial burrows, after which eviction of the owls with the project site could begin. Use of one way doors would be used to facilitate passive relocation of owls.</p> <p>A. Monitoring and Success Criteria. The Designated Biologist shall survey the compensatory mitigation area and suitable habitat within 600-meter radius from the project site to assess use of the artificial burrows by owls and relocation success after exclusion from the project area. Surveys shall be conducted using methods consistent with Phase II and Phase III California Burrowing Owl Consortium guidelines. Surveys shall be conducted two times in the spring and two times in the winter following eviction. This second survey within a season shall be conducted within 30 days of the first. Surveys shall continue for two years to encompass a total of two spring seasons (4 total spring surveys) and two winter seasons (4 total winter surveys). Surveys and monitoring shall be conducted using non-invasive methods (i.e., high-powered binoculars, spotting scope, or camera). Owls shall not be trapped or otherwise handled to read the color band. If survey results indicate BOs are not nesting within the surveys area, remedial actions may be developed and implemented in consultation with the CPM, CDFG, and USFWS to correct conditions at the site that might be preventing owls from nesting there. A report describing survey results and any remedial actions taken shall be submitted to the CPM, CDFG and USFWS no later than January 31 of each year for two years.</p> <p>4. PRESERVE AND MANAGE COMPENSATORY HABITAT. For each individual owl or pair identified on the project site during pre-construction surveys, off-site mitigation shall be required as described in the California Burrowing Owl Consortium guidelines (CBOC 1993). Determining which ratio to apply depends on whether the proposed compensatory habitat is occupied or unoccupied.</p> <p>A. Replacement of occupied habitat with occupied habitat: 1.5 times 6.5 (9.75) acres per pair of single bird</p> <p>B. Replacement of occupied habitat with suitable unoccupied habitat: 3 times 6.5 (19.5) acres per pair of single bird.</p> <p>Compensatory habitat shall be suitable for occupation by burrowing owls and preserved and managed in perpetuity for this purpose. Compensatory mitigation may be within the 118.2 acres proposed for desert tortoise and MGS (refer to BIO-</p>			

Condition ID	Description of Requirement	Verification	Responsible Party	Due Date
BIO-13 (Contd.)	<p>15), provided that it also meets the criteria for suitable burrowing owl habitat. The compensatory habitat shall be managed for the benefit of burrowing owls, with the specific goals of:</p> <ul style="list-style-type: none"> A. Maintaining the functionality of artificial and natural burrows; and B. Minimizing the occurrence of weeds (species considered “moderate” or “high” threat to California wildlands as defined by CAL-IPC [2006] and noxious weeds rated “A” or “B” by the California Department of Food and Agriculture and any federal-rated pest plants [CDFA 2009]) at less than 10% cover of the shrub and herb layers. <p>The Burrowing Owl Plan shall also include monitoring and maintenance requirements for the compensatory habitat, details on methods for measuring compliance goals, and remedial actions to be taken if management goals are not met. The final Burrowing Owl Plan is due before preconstruction surveys begin to ensure that an approved relocation methodology will be followed for any owls occurring within the project area. Therefore, it is understood that the compensatory mitigation acreage (if required) may not be identified in the Burrowing Owl Plan. However, the Plan shall propose a location for compensatory mitigation land and the acreage required, quantified according to the CBOC methods outlined above. If owls are identified during the pre-construction survey, the project owner shall submit an addendum to the Burrowing Owl Plan, which identifies the number of owls identified and the exact acreage to be preserved and managed in perpetuity for burrowing owl based on the results of the preconstruction survey and as agreed to in consultation with CDFG.</p>			
BIO-14	<p>AMERICAN BADGER AND DESERT KIT FOX IMPACT AVOIDANCE AND MINIMIZATION MEASURES: To avoid direct impacts to American badgers and desert kit fox, pre-construction surveys shall be conducted for these species concurrent with the DT surveys. Surveys shall be conducted as described below.</p> <ul style="list-style-type: none"> • Biological Monitors shall perform pre-construction surveys for badger and kit fox dens in the Project disturbance area, including areas within 250 feet of the project site. If burrows are detected, each burrow shall be classified as inactive, potentially active, or definitely active. • Inactive burrows and setts that would be directly impacted by construction activities shall be excavated by hand and backfilled to prevent reuse by badgers or kit fox. • Potentially and definitely active burrows and setts shall not be disturbed during the whelping/pupping season (February 1 - September 30). Potentially and definitely active dens that would be directly impacted by construction activities shall be monitored by the Biological Monitor for three consecutive nights using a tracking medium (such as diatomaceous earth or fire clay) and/or infrared camera stations at the entrance. If no tracks are observed in the tracking medium or no photos of the target species are captured after three nights, the den shall be excavated and backfilled by hand. If tracks are observed, the Biological Monitor shall directly observe the burrow or sett and block the entrance after the animal exits and the Biological Monitor has verified that there are no animals in the burrow or sett. The burrow or den shall be blocked with natural materials (e.g., rocks, dirt, sticks, and vegetation piled in front of the entrance) or passive hazing methods shall be employed for the next three to five nights to discourage the badger or kit fox from continued use. Passive hazing methods shall be approved by CDFG. Live or other traps shall not be used (CCR Title 14 Section 460). A kit fox or badger shall never be trapped in its burrow/sett. After verification that the den is unoccupied it shall then be 	<p>The project owner shall submit a report to the CPM and CDFG within 30 days of completion of badger and kit fox surveys. The report shall describe survey methods, results, measures implemented, and the results of the measures.</p>	<p>Project Owner, Biological Monitor, & Designated Biologist</p>	<p>Within 30 days of completion of badger and kit fox surveys.</p>

Condition ID	Description of Requirement	Verification	Responsible Party	Due Date
	excavated and backfilled by hand to ensure that no badgers or kit fox are trapped in the den.			
BIO-15	<p>COMPENSATORY MITIGATION. To fully mitigate for the habitat loss and incidental take of DT and MGS as well as BO, the project owner shall acquire, prior to ground-disturbing activities, in fee or in easement, no less than 118.2 acres of land suitable for these species and shall provide funding for the enhancement and long-term management of the compensation lands that may be delegated by written agreement to CDFG or a third party, such as a non-governmental organization dedicated to habitat conservation. If habitat disturbance exceeds that described in the analysis, the owner shall be responsible for acquisition and management of additional compensation lands and/or funds required to compensate for any additional habitat disturbance. Additional funds shall be based on the adjusted market value of compensation lands at the time of construction to acquire and manage habitat. The acquisition and management of compensation lands shall include, but is not limited to, the following elements:</p> <p>1. SELECTION CRITERIA FOR COMPENSATION LANDS. The compensation lands selected for acquisition of title/easement transfer shall:</p> <p>A. have substantial capacity to support resident and dispersing DT, MGS, and BO;</p> <p>B. be a contiguous block of land (preferably) or located so that parcel(s) result in a contiguous block of protected habitat;</p> <p>C. not be encumbered by easements of uses that would preclude fencing of the site or preclude management of the site for the primary benefit of the species for which mitigation lands were secure; and,</p> <p>D. include mineral/water rights or ensure that those rights may not be evoked in a manner to negate the values of compensation lands.</p> <p>2. REVIEW AND APPROVAL OF COMPENSATION LANDS PRIOR TO TITLE/EASEMENT TRANSFER. A minimum of three months prior to acquisition or transfer of the property title and/or easement, the owner, or a third party approved by the CPM, in consultation with CDFG and USFWS, shall submit a proposal to the CPM. CDFG and USFWS describing parcel(s) intended for purchase or title/easement transfer. This proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for DT, MGS, and BO in relation to the criteria listed above. Approval from the CPM, in consultation with USFWS and CDFG, B66 shall be required for acquisitions of all parcels comprising no less than 118.2 acres in advance of purchase or title/easement transfer.</p> <p>3. REVIEW AND APPROVAL OF COMPENSATION LANDS MANAGEMENT PLAN. Within six months of the lands or easement purchase or transfer, as determined by the date on the title, the project owner, or a third-party approved by the CPM, in consultation with CDFG and USFWS, shall submit a compensation lands management plan to the CPM, CDFG, and USFWS. The plan shall include, but not be limited to proposed measures to enhance habitat (e.g., removal of structures and other human attractants); maintenance procedures; and general maintenance provisions (e.g., trash dumping, trespass, pesticide use avoidance, etc.).</p> <p>4. MITIGATION SECURITY FOR COMPENSATION LANDS AND AVOIDANCE/MINIMIZATION MEASURES. The project owner shall provide financial assurances to the CPM, with copies of the document(s) to CDFG and USFWS, to guarantee that an adequate level of funding is available to implement all biological avoidance, minimization, and compensation measures</p> <p>described in the conditions of certification. These funds shall be used solely for implementation of the measures associate with the project.</p>	<p>No less than 90 days prior to acquisition of the property, the project owner, or a third-party approved by the CPM, in consultation with CDFG and USFWS, shall submit a formal acquisition proposal to the CPM, CDFG, and USFWS describing the parcel(s) intended for purchase or title/easement transfer. At least 30 days prior to construction-related ground disturbance (or as allowed under 5(e), above), the project owner shall provide written verification to the CPM that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient(s). Within six months of the land or easement purchase, as determined by the date on the title, the project owner shall provide the CPM with a management plan for review and approval, in consultation with CDFG, for the compensation lands and associated funds.</p> <p>Within 90 days after completion of project construction, the project owner shall provide to the CPM verification that disturbance to desert tortoise and MGS habitat did not exceed 430 acres, and that construction activities did not result in impacts to desert tortoise, MGS, and burrowing owl habitat adjacent to work areas. If habitat disturbance exceeds that described in this analysis, the CPM shall notify the project owner of any additional funds required or lands that must be purchased to compensate for any additional habitat disturbances at the adjusted market value at the time of construction to acquire and manage habitat.</p> <p>If electing to use an in-lieu fee provision, the project owner shall request from the Energy Commission a determination that the project's in-lieu fee proposal meets CEQA and CESA requirements.</p>	Project Owner	<p>Agreements to delegate land acquisition or management within 12 months of the CEC decision. Submit a formal acquisition proposal no less than 90 days prior to acquisition of the property.</p> <p>At least 30 days prior to construction-related ground disturbance (or as allowed under 5(e), above), the project owner shall provide written verification to the CPM that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient(s).</p>

Condition ID	Description of Requirement	Verification	Responsible Party	Due Date
BIO-15 (Contd.)	<p>5. CONDITIONS FOR ACQUISITION OF COMPENSATION LANDS. The project owner shall comply with the following conditions relating to acquisition of compensation lands or transfer of the property's title and/or easement after the CPM, in consultation with CDFG and USFWS, has approved the proposed compensation land as described above.</p> <p>A. Preliminary Report. The project owner, or approved third party, shall provide a recent preliminary title report (no more than six months old), hazardous materials survey report (i.e., Phase I ESA), biological analysis, and other necessary documents for the proposed 118.2 acres. All documents conveying or conserving compensation lands and all conditions of title/easement are subject to a field review and approval by the CPM, in consultation with CDFG and USFWS, California Department of General Services, and, if applicable, the Fish and Game Commission and/or Wildlife Conservation Board.</p> <p>B. Title/Conveyance. The project owner shall transfer fee title/deed or a conservation easement for 118.2 acres of compensation lands to CDFG under terms approved by CDFG. Alternatively, a CPM-approved, in consultation with CDFG and USFWS, non-project 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 and USFWS; in the event an approved non-profit holds a conservation easement over the compensation lands, CDFG shall be named a third-party beneficiary. USFWS shall be named a third-party beneficiary regardless of who holds the easement. The project owner shall also provide a property assessment and warranty.</p> <p>C. Enhancement Fund. The project owner shall fund the initial protection and enhancement of the 118.2 acres by providing the enhancement fund to the CDFG. Alternatively, a CPM-approved, in consultation with CDFG and USFWS, non-profit organization qualified pursuant to California Government Code section 65965 to manage the compensations land may hold the enhancement funds. If CDFG takes fee title to the compensation lands, the enhancement fund must go to CDFG.</p> <p>D. Endowment Fund. Prior to ground-disturbing project activities, the project owner shall provide to CDFG a capital endowment in the amount determined through the Property Analysis Record (PAR) or PAR-like analysis that will be conducted for the 118.2 acres of compensation lands. Alternatively, a CPM-approved, in consultation with CDFG and USFWS, non-profit organization qualified pursuant to California Government Code section 65965 may hold the endowment fees. If CDFG takes fee title to the compensation lands, the endowment must go to CDFG, where it will likely be held in the special deposit fund established pursuant to Government Code section 16370. If the special deposit fund is not used to manage the endowment, the California Wildlife Foundation will manage the endowment for CDFG and with CDFG guidance. The project owner and the CPM shall ensure that an agreement is in place with the endowment holder/manager to ensure the following: <u>Interest.</u> Interest generated from the initial capital endowment shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action designed to protect or improve the habitat values of the compensation lands. <u>Withdrawal of Principal.</u> The endowment principal shall not be drawn upon unless such withdrawal is deemed necessary by the CDFG or the approved third-party endowment manager to ensure the continued viability of the species on the 118.2</p>			

Condition ID	Description of Requirement	Verification	Responsible Party	Due Date
BIO-15 (Contd.)	<p>acres. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision will likely be deposited in a special deposit fund established pursuant to Government Code section 16370. If the special deposit fund is not used to manage the endowment, the California Wildlife Foundation will manage the endowment for CDFG and with CDFG guidance.</p> <p><u>Pooling Endowment Funds.</u> CDFG, or a CPM-approved, in consultation with CDFG and USFWS, non-profit organization qualified pursuant to California Government Code section 65965 to hold endowments for the operation, management, and protection of the 118.2 acres for local populations of DT and MGS. However, for reporting purposes, the endowment fund must be tracked and reported individually.</p> <p>E. Security Deposit. The project owner may proceed with ground disturbing activities before fully performing its compensatory mitigation duties and obligations as set forth above only if the project owner secures its performance by providing funding to CDFG (Security Deposit), or if CDFG approves, administrative proof of funding, necessary to cover easement costs, fencing/cleanup costs, and as necessary, initial protection and enhancement of the compensation lands. If the Security is provided to allow the commencement of project disturbance prior to completion of compensation actions, the project owner has failed to comply with the conditions of certification, The security will be returned to the project owner upon completion of an implementation agreement with a third party mitigation banking entity acceptable to the CPM and CDFG, to acquire and/or manage the compensation lands. The security is calculated as follow:</p> <ul style="list-style-type: none"> - Costs of enhancing compensation lands are estimated at \$250 per acre. - Costs of establishing an endowment for long-term management of compensation land are estimated at \$1,300 per acre. <p>F. Reimbursement Fund. The project owner shall provide reimbursement to the CDFG or approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other state agency reviews; and overhead related to providing compensation lands. The project owner is responsible for all compensation lands acquisition/easement costs, including but not limited to, title and document review costs, as well as expenses incurred from other state agency reviews and overhead related to providing compensation lands to the department or approved third party; escrow fees or costs; environmental contaminants clearance; and other site cleanup measures. The project owner may choose to satisfy its mitigation obligations by paying an in-lieu fee instead of acquiring compensation lands to mitigate for 118.2 acres of habitat, pursuant to California Senate Bill 34 (enacting CESA § 2069 and 2099) or other applicable in-lieu fee provision, to the extent the in-lieu fee provision is found by the Energy Commission to be in compliance with CEQA and CESA requirements.</p>			

Condition ID	Description of Requirement	Verification	Responsible Party	Due Date
BIO-16	<p>TAMARISK ERADICATION, MONITORING, AND REPORTING PROGRAM. The project owner shall ensure effective removal of tamarisk by designing and implementing a monitoring and reporting plan. The plan shall include proposed methods for tamarisk removal and treatment, monitoring and maintenance procedures/timeline, irrigation, success standards and contingency measures, and monitoring and maintenance objectives to prevent the reinvasion of undesirable weeds and/or invasive wildlife species for a minimum of five years. This plan shall include identification on a map of each location and size of non-native vegetation to be removed, and the methods proposed to remove and dispose of invasive wildlife species. Exotic, non-native, and invasive species removal shall be conducted throughout the monitoring and maintenance period. Prior to any tree removal, it will be verified that there are no nesting raptors or other MBTA-protected birds. For the CPM and CDFG to deem eradication successful: 1) the site shall not contain more than 5 percent exotic plant species of the CPM and CDFG to deem the tamarisk removal successful.</p> <p>2) All plant species with rate of dispersal and establishment listed as "high" or "moderate" on the California Invasive Plant Inventory shall have documented absence, or have been removed from the site for at least three years for the CPM and CDFG to deem the site successful.</p> <p>3) The site shall not contain invasive wildlife species for the CPM and CDFG to deem the site successful.</p> <p>Monitoring and maintenance of the site shall be conducted for five years unless less monitoring can be justified. Following the first year of monitoring, if the project owner petitions to terminate the monitoring program, staff and CDFG will determine whether more years of monitoring are needed.</p>	<p>At least 30 days prior to any construction-related ground disturbance, the project owner shall submit to the CPM a copy of the Energy Commission staff- and CDFG-approved Tamarisk Eradication Monitoring and Reporting Plan, including success criteria. The Designated Biologist shall submit annual reports to the CPM and CDFG describing the dates, durations and results of monitoring. The reports shall fully describe the status of the tamarisk at the eradication site, and shall describe any actions taken to remedy regrowth. The CPM and CDFG shall: 1) verify compliance with protective measures to ensure the accuracy of the project owner's mitigation, monitoring and reporting efforts; and 2) review relevant documents maintained by the project owner, interview the project owner's employees and agents, inspect the work site, and take other actions as necessary to assess compliance with or effectiveness of protective measures.</p>	Project Owner & Designated Biologist	<p>Submit Tamarisk Eradication Monitoring and Reporting Plan at least 30 days prior to any construction-related ground disturbance.</p> <p>Monitoring and maintenance of the site shall be conducted for five years unless less monitoring can be justified.</p>
BIO-17	<p>MONITORING IMPACTS OF SOLAR COLLECTING TECHNOLOGY ON BIRDS. The project owner shall prepare and implement a Bird Monitoring Study to monitor the death and injury of birds from collisions with facility features such as reflective mirror-like surfaces and from heat, and bright light from concentrating sunlight. The study design shall be approved by the CPM in consultation with the CDFG and USFWS, and shall be incorporated in to the projects BRMIMP and implemented. The Bird Monitoring Study shall include detailed specification on data and carcass collection protocol and a rationale justifying the proposed schedule or carcass searches. The study shall also include seasonal trials to assess bias from carcass removal by scavengers as well as searcher bias.</p>	<p>At least 60 days prior to commercial operation, the project owner shall submit to the CPM, USFWS, and CDFG and draft Bird Monitoring Study. The CPM shall review and provide written comments within 15 days of receipt of the Bird Monitoring Study. At least 30 days prior to start of commercial operation, the project owner shall provide the CPM with the final version of the Bird Monitoring Plan that has been reviewed and approved by the CPM, in consultation with CDFG and USFWS. All modifications to the Bird Monitoring Study shall be made only after approval from the CPM." All modifications to the Bird Monitoring Study shall be made only after approval from the CPM.</p> <p>For at least two years following the beginning of operation the Designated Biologist shall submit quarterly reports to the CPM, CDFG, and USFWS describing the dates, durations and results of monitoring. The quarterly reports shall provide a detailed description of any Project-related bird or wildlife deaths or injuries detected during the monitoring study or at any other time.</p> <p>Following the completion of the fourth quarter of monitoring the Designated Biologist shall prepare an Annual Report that summarizes the year's data, analyzes any Project-related bird fatalities or injuries detected, and provides recommendations for future monitoring and any adaptive management actions needed. The Annual Report shall be provided to the CPM, CDFG, and USFWS.</p> <p>Quarterly reporting shall continue until the CPM, in consultation with CDFG and USFWS, determine whether</p>	Project Owner	<p>Submit a draft Bird Monitoring Study at least 60 days prior to commercial operation of the plant.</p>

Condition ID	Description of Requirement	Verification	Responsible Party	Due Date
		more years of monitoring are needed, and whether mitigation (e.g., development and/or implementation of bird deterrent technology) and/or adaptive management measures are necessary. After the Bird Monitoring Study is determined by the CPM to be complete, the project owner or contractor shall prepare a paper that describes the study design and monitoring results to be submitted to a peer-reviewed scientific journal. Proof of submittal shall be provided to the CPM within one year of concluding the monitoring study.		
BIO-18	<p>RAVEN MANAGEMENT PLAN: The project owner shall implement the following measures to manage their construction site and related facilities in a manner to control raven populations and to mitigate cumulative and indirect impacts to desert tortoise associated with regional increases in raven numbers:</p> <p>1. <u>Common Raven Monitoring, Management, and Control Plan.</u> The project owner shall design and implement a Common Raven Monitoring, Management, and Control Plan that is consistent with the most current USFWS-approved raven management guidelines and that meets the approval of USFWS, CDFG, and Energy Commission staff. The Raven Plan shall:</p> <p>A. Identify conditions associated with the project that might provide raven subsidies or attractants;</p> <p>B. Describe management practices to avoid or minimize conditions that might increase raven numbers and predatory activities;</p> <p>C. Describe control practices for ravens;</p> <p>D. Address monitoring and nest removal during construction and for the life of the project;</p> <p>E. And discuss reporting requirements.</p> <p>2. <u>USFWS Regional Raven Management.</u> The project owner shall submit payment to the project sub-account of the Renewable Energy Action Team (REAT) Account held by the National Fish and Wildlife Foundation (NFWF) to support the regional raven management plan. The amount shall be a one-time payment of \$105 per acre of land permanently disturbed by the project.</p>	At least 30 days prior to start of any construction-related ground disturbance activities, the project owner shall provide the CPM, USFWS, and CDFG with the final version of the Raven Management Plan that has been reviewed and approved by USFWS and CDFG. The CPM shall determine the plan's acceptability within 10 days of receipt of the final plan. All modifications to the approved Raven Management Plan must be made only after consultation with the Energy Commission staff, USFWS, and CDFG. The project owner shall notify the CPM no less than five working days before implementing any CPM-approved modifications to the Raven Plan. Prior to start of any construction-related ground disturbance activities, the project owner shall submit to the CPM verification of payment to the REAT Account to support the regional raven monitoring plan. Payment shall be included in the AMS project's land management enhancement fund, pursuant to Condition of Certification BIO-15 (5(D)). Within 30 days after completion of project construction, the project owner shall provide to the CPM for review and approval a report identifying which items of the Raven Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which items are still outstanding.	Project Owner & Designated Biologist	Submit the final version of a Raven Plan no less than 10 days prior to the start of any project-related ground disturbance activities. Prior to the start of any Project-related ground disturbance activities, provide documentation that the one-time fee for the USFWS Regional Raven Management Program has been deposited to the REAT-NFWS subaccount for the Project. Within 30 days after completion of project construction, submit a report identifying which items of the Raven Plan have been completed, a summary of all modification to mitigation measures made during the project's construction phase, and which items are still outstanding.
BIO-19	<p>EVAPORATION POND MONITORING AND ADAPTIVE MANAGEMENT PLAN: The project owner shall design and implement an Evaporation Pond Monitoring and Adaptive Management Plan that meets the requirements of the USFWS and CDFG, RWQCB, and the CPM. The objective of the Plan is to define the monitoring and reporting procedures as well as triggers for adaptive management strategies that shall be implemented to prevent wildlife mortality at the evaporation ponds. The plan shall include:</p> <ul style="list-style-type: none"> A description of evaporation pond design features such as side slope specifications, freeboard and depth requirements, which will prevent use by wildlife; A detailed description of the wildlife monitoring procedures and schedule. For the initial implementation of a new technology, daily monitoring shall be conducted both at the project evaporation ponds and the wetlands within the Harper Lake ACEC. Monitoring may be reduced to weekly and 	At least 30 days prior to operation of the evaporation ponds, the project owner shall provide the CPM, USFWS, RWQCB, and CDFG with the final version of the Plan that has been reviewed and approved by the CPM in consultation with USFWS, RWQCB, and CDFG. The project owner shall first submit a draft plan to the CPM that incorporates the guidance in this condition. The CPM, in coordination with USFWS, RWQCB, and CDFG, shall provide written comments to the project owner within 30 days of receipt of the draft plan and shall determine the acceptability of the final plan within 15 days of its receipt. All modifications to the approved Plan may be made by the CPM after consultation with USFWS, RWQCB, and CDFG. The project owner shall notify the CPM no less than five working	Project Owner & Designated Biologist	Submit Final Evaporation Pond Monitoring Plan at least 30 days prior to operation of the evaporation ponds. Monthly reports for the first year and quarterly thereafter.

Condition ID	Description of Requirement	Verification	Responsible Party	Due Date
BIO-19 (Contd.)	<p>potentially bi-weekly or monthly depending on the results of initial monitoring period.</p> <ul style="list-style-type: none"> A detailed description of the water quality and water level monitoring procedures and schedule. Water quality and water level monitoring shall coincide with wildlife monitoring to provide a basis for comparative analysis. A description of wildlife exclusion/deterrent technologies and adaptive management strategies. Technologies shall include, but are not limited to netting, and shall not disturb or harass non-target wildlife adjacent to the project area. Triggers for adaptive management (i.e., modifications to existing technology or replacement with new technology). Adaptive management shall be necessary if: <ul style="list-style-type: none"> 1) more than one dead bird per quarter is discovered at the evaporation ponds; or 2) one special status animal is discovered at the evaporation ponds; or 3) noise levels attributable to the technology exceed 60 dB at the Harper Lake ACEC wetlands. After three failed attempts at new technology or modification of existing technology, the ponds shall be netted; Reporting requirements, to include monthly reporting for the first year if a technology other than netting is used. Reporting may be reduced to monthly or quarterly thereafter if no bird or wildlife deaths are reported during the first year. If wildlife mortality occurs at the ponds or if birds are disturbed at the marsh as described above, the CPM shall be notified within 10 days of the incident and the accompanying adaptive management action to be implemented. 	days before implementing any CPM-approved modifications to the Evaporation Pond Plan.		
BIO-20	HARPER DRY LAKE MARSH WATER DELIVERY. To ensure continuity of water delivery to the Harper Dry Lake ACEC, the project owner shall not decommission the existing well on Mojave Solar, LLC-owned property that currently serves the Harper Dry Lake marsh (wetland well) until an alternate well is able to effectively convey a minimum of 75 acre-feet per year to the Harper Dry Lake marsh.	At least 15 days prior to decommissioning the wetland well, the project owner shall provide proof, to the satisfaction of the CPM, that the alternate well is completed and able to effectively convey a minimum of 75 acre feet per year to the Harper Dry Lake marsh. Proof shall include, but not be limited to, a description of the well parameters, as constructed.	Project Owner	At least 15 days prior to decommissioning.
BIO 21	USFWS BIOLOGICAL OPINION. The project owner shall provide a copy of the Biological Opinion per Section 7 to the federal Endangered Species Act written by the USFWS in consultation with the U.S. Department of Energy. The terms and conditions contained in the Biological Opinion shall be incorporated into the project BRMIMP and implemented by the project owner.	For the Biological Opinion to effectively provide guidance on pre-construction actions for listed species (e.g., desert tortoise clearance surveys and translocation), the project owner shall submit to the CPM a copy of the USFWS's Biological Opinion at least 45 days prior to the start of any pre-construction site mobilization. At this time the project owner shall also verify that the permit terms and conditions of the Biological Opinion are incorporated into the BRMIMP and will be implemented.	Project Owner	At least 45 days prior to the start of any pre-construction site mobilization.

Notes:

Source: Final Decision refers to the CEC Commission Decision September 15, 2010. The biological resources COCs are found in Appendix A.

Responsible Party: In the BRMIMP report, "PVS" is used instead of "Owner." "Owner" used in this table to be consistent with usage in COCs.

CPM - refers to the CEC Compliance Project Manager

3.1.2 Biological Opinion Minimization Measures

The USFWS Biological Opinion for the Project includes measures to minimize adverse effects to DT. The following types of minimization measures are included in the Biological Opinion:

- General protective measures
- Management for common ravens
- Weed management
- Protective measures specific to the SCE fiber optic cable installation
- Desert tortoise translocation

A detailed description of the minimization measures are include in the final Biological Opinion (Appendix J).

3.1.3 USFWS Correspondence Regarding Bald and Golden Eagle Act Compliance

The Project Owner has coordinated with USFWS and agreed to the following measures to ensure that any potential impacts to golden eagles resulting from construction and/or operation of the Project will be fully compensated. Appendix C includes documentation pursuant to COC BIO-10 that the project is in compliance with the Bald and Golden Eagle Protection Act.

1. Pursuant to CEC License Decision COC LAND-1, the Project Owner will mitigate for the loss of 128 acres of agricultural land recently under production on the plant site by providing for the purchase of 128 acres of comparable agricultural land or an easement guaranteeing 128 acres of comparable land will be available in perpetuity for productive agricultural use. This will also provide foraging habitat for golden eagles within the project area.
2. Pursuant to CEC License Decision COC BIO-20, the Project Owner will ensure continuity of water delivery to the Harper Dry Lake ACEC by providing an alternate well able to effectively convey a minimum of 75 acre feet per year to the Harper Dry Lake marsh, which will also enhance and provide foraging habitat for golden eagles within the project area.
3. Pursuant to CEC License Decision COC BIO-15, the Project Owner will provide 118.2 acres of land suitable for desert tortoise, Mojave ground squirrel, and burrowing owl to compensate for the loss of habitat for these species on the plant site. The compensation

land is located directly west of the Project plant site and will provide suitable foraging habitat for golden eagles. The Project Owner also will provide funding for the enhancement and long-term management of the compensation lands.

4. The Project Owner will provide funding in the amount of \$60,000 into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). This money will be spent on monitoring and other actions that the Service, the Bureau of Land Management (Bureau), and the CEC determine would be beneficial to golden eagles located in a 10-mile radius of the Project. The Project Owner established this figure based on a 10-year breeding season monitoring program for the Black Mountain golden eagle territory within the 10-mile radius of Project and an estimate of implementing a conservation action (e.g. road restrictions) in the vicinity of the Black Mountain nests, each costing approximately \$30,000. It is anticipated that the money will be used to implement these action or other actions agreed upon by the Bureau, the Service, and the CEC that would be beneficial to golden eagles within a 10-mile radius of the Project. Other actions could include, but are not limited to, implementing road restrictions along Black Mountain Road by placing large boulders along the road in those sections directly alongside the golden eagle nests to discourage parking and loitering; implementing seasonal road closures of Black Mountain Road by erecting steel gates at the northern and southern ends of Black Mountain Wash; or funding Bureau staff to enforce seasonal restrictions.

USFWS has recommended that Mojave Solar prepare an Avian and Bat Protection Plan (ABPP). The Bird Monitoring Study prepared for BIO-17 will follow the guidelines for an ABPP and will satisfy USFWS's request for an ABPP.

3.2 HABITAT IMPACTS ACREAGE

3.2.1 Natural Communities Impacted

No impacts from construction or operation would occur to sensitive vegetation communities because no such communities occur within the Project Area (Mojave Solar 2009).

Within the Project Area, 11.03 acres of habitat meet the parameters required for designation as potential "waters of the U.S." (wetland in the form of tamarisk scrub). The USACE has determined, however, that all aquatic features occurring within the proposed project area are isolated and not under their jurisdiction.

Impacts to approximately 10.76 acres of these 11.03 acres will be avoided by the Project Owner by establishing a construction exclusion zone within which no equipment or personnel would enter and no work would be conducted. The remaining 0.27 acres would be removed during construction.

The project’s construction of the drainage channel outlet at Harper Dry Lake will result in removal of 1.47 acres of tamarisk scrub, which are considered potential “waters of the State” (in the form of riparian extent/lakebed). The CDFG has determined, however, that all aquatic features occurring within the proposed project area are not under their jurisdiction. The Project Owner is required to ensure effective removal of tamarisk by designing and implementing a monitoring and reporting plan (Appendix F),

3.2.2 Impacts to Habitat for Sensitive Wildlife Species

Table 3-2 provides a summary of the acres of impacts from the Project to habitat for special-status species, as determined through discussions with USFWS, CDFG, and CEC, and required by the Final Commission Decision.

**Table 3-2
Impacts to Habitat for Special-Status Wildlife Species**

Listed Species	Total Impact ¹
Desert tortoise	225.84 acres
Mohave ground squirrel	225.84 acres
Western burrowing owl	1 pair

¹ The total impact reflects those suitable habitat areas (for desert tortoise and Mohave ground squirrel) and assumed western burrowing owl pair locations within the Project boundary, which assumes direct, permanent impacts within the limits of the boundary.

3.3 HABITAT MITIGATION

3.3.1 Impact Minimization and Mitigation for Natural Communities

Direct and indirect impacts to approximately 1.47 acres of potential waters of the state were discussed in the Final Commission Decision. Although no jurisdiction was taken over the potential waters of the state, development of a tamarisk eradication plan (Appendix F) was required as part of the conditions of certification. The dry desert washes that stop at the Project

Area boundary do not continue across the site. Any surface flows from these dry desert washes cross the Project Area as sheetflow. The sheetflow that crosses the Project Area will be rerouted as part of the Project design, via stormwater channels along the southern and eastern edge of the plant site, as well as through the Project Area before both stormwater channels connect on the eastern edge of the plant site, and discharging into Harper Dry Lake (Mojave Solar 2009).

3.3.2 Impact Minimization and Mitigation for Habitat for Sensitive Wildlife Species

Table 3-3 provides a summary of the mitigation for Project impacts to habitat for special-status species. Appendix N includes the list of Special-Status Species Known or Potentially Occurring in the Project Area. Mitigation for permanent impacts to these species is provided by acquiring and conserving in-kind habitat of equal or greater value than the habitat impacted.

**Table 3-3
Mitigation for Impacts to Habitat for Special-Status Wildlife Species**

Listed Species	Mitigation Ratio	Total Impact ¹	Total Mitigation Acreage ²
Desert Tortoise	0.5:1 to 5:1	225.84 acres	118.2 acres
Mohave Ground Squirrel	0.5:1 to 5:1	225.84 acres	118.2 acres
Western Burrowing Owl	6.5 to 19.5 acres per pair ³	1 pair	6.5 to 19.5 acres
Total Mitigation Acreage			118.2 ⁴

¹ The total impact reflects those suitable habitat areas (for desert tortoise [DT] and Mohave ground squirrel [MGS]) and assumed western burrowing owl [WBO] pair locations within the Project boundary, which assumes direct, permanent impacts within the limits of the boundary. Impacts to DT and MGS habitats, and associated mitigation ratio ranges, were determined subsequent to submittal of the AFC, through discussions between MSLLC, USFWS, CDFG, and CEC.

² Per the Biological Assessment, compensation ratios for DT were determined in consultation with Tonya Moore of CDFG and Ashleigh Blackford of USFWS (Table 3 of the BA; Mojave Solar 2011). A range of compensation ratios from 0.5:1 to 5:1 was assigned based on the habitat value of the three vegetation communities being impacted (Disturbed desert salt-bush regrowth [0.5:1], Disturbed desert salt-bush scrub[2:1], and Undisturbed desert salt-bush scrub [5:1]).

³ Per California Burrowing Owl Consortium/California Department of Fish and Game guidelines.

⁴ Mojave Solar assumes that the mitigation parcel selected to mitigate impacts to DT, MGS, and WBO would provide habitat for all three species, such that the greatest mitigation acreage (225.84 acres) would suffice for all three species.

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4.0 WORKER ENVIRONMENTAL AWARENESS PROGRAM

4.1 WORKER ENVIRONMENTAL AWARENESS PROGRAM OVERVIEW

Mojave Solar will develop and implement a CEC-approved WEAP. The WEAP will consist of a document that identifies and discusses:

- The Project description;
- Biological resources with potential to occur within the Project site;
- Avoidance and minimization measures for these biological resources;
- Environmental rules for employees;
- Designated parking and avoidance areas;
- A description of the power plant and its associated facilities;
- The locations and types of sensitive biological resources on the Project site and adjacent areas;
- Information regarding species and habitat identification and occurrence;
- The natural history and endangerment factors for all sensitive species targeted for mitigation;
- The reasons for protecting these resources and the requirements of the Federal and State Endangered Species Acts;
- A description of the temporary and permanent measures being taken at the Project site to protect habitat and therefore avoid harming sensitive resources;
- Construction limitations and activities;
- The responsibilities of workers, including reporting procedures if species are located during construction activities;
- Appropriate protocols for dealing with protected species when encountered in and around the Project site or its associated appurtenances (e.g., linear facilities); and
- Who to contact if further comments and questions arise about the material discussed in the program.

Specific direction will be provided to workers on the following:

- No firearms are allowed at the Project site;
- Designated areas for driving and parking of vehicles;
- Speed limits;
- Control of litter by placing all trash in covered containers;
- Avoidance of areas around sensitive resources;
- Maintenance of erosion control devices;
- Reporting sightings of threatened and endangered species;
- Not approaching or feeding wildlife;
- Checking under vehicles for wildlife before starting engines;
- Not bringing pets to the Project site; and
- Reporting all spills of gasoline, diesel fuel, lubricants, paints, and cleaners.

The above-referenced information may be presented in a video or handbook format (or equivalent) along with cultural and paleontological resources training. Workers will be provided with a sticker to attach to their hard hats to show proof of attending WEAP training. Contractors, their employees, and other personnel working on the Project site will receive training on special-status species potentially occurring in the Project site. The program will be presented by the DB, Biological Monitor(s) or, upon approval by the CPM, a site-specific training video will be presented in lieu of the DB or Biological Monitor training. The program materials describing this information will be distributed to all Mojave Solar employees, contractors, subcontractors, and anyone else who may enter the Project site. Each participant in the WEAP will sign a statement declaring that the individual understands and will abide by the guidelines set forth in the program materials. The person administering the program will also sign each statement. New workers will receive training upon employment.

4.2 WEAP FREQUENCY AND TIMING

Throughout the life of the Project, the WEAP will be repeated annually for permanent employees and will be routinely administered within one week of arrival to any new construction personnel, foremen, contractors, subcontractors, and other personnel potentially working within the Project area. Upon completion of the orientation, employees will sign a form stating that they attended the program and understand all protection measures.

Training acknowledgement forms signed during construction will be kept on file by the Project owner for a period of at least six months after the start of commercial operation.

During Project operation, signed statements for operational personnel will be kept on file for six months following termination of an individual's employment.

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5.0 PRE-CONSTRUCTION SURVEYS AND REPORTING

The primary use of pre-construction surveys for this Project will be to locate and/or relocate avoidance areas for sensitive species identified during the biological surveys for the AFC. Pre-construction surveys of the Project Area will be conducted prior to commencement of ground-disturbing activities, in compliance with the COCs listed in Table 3-1. Pre-construction surveys will include a comprehensive survey and mapping effort. Results of surveys will be included in the initial monthly monitoring report and post-construction compliance report.

5.1 PRE-CONSTRUCTION SURVEYS

Pre-construction surveys for special-status species (e.g., State and Federal protected species, nesting passerines, and raptors) and their habitats will be conducted prior to commencement of ground-disturbing activities for pre-construction mobilization, construction operation, and maintenance of the Project. Specific timing requirements of species-specific pre-construction surveys are outlined in the COCs. Pre-construction surveys will include the following areas:

- Project site;
- Laydown and employee parking areas; and
- Other areas subject to physical ground disturbance.

5.1.1 Pre-construction Survey Data Forms

A data form will be developed to assist in the performance of pre-construction surveys and survey database. The DB will maintain these forms and will provide copies to the CEC and other appropriate agencies upon request.

5.1.2 Pre-construction Survey Reporting

Pre-construction survey results will be included in the monthly biological monitoring report that will be sent to the CEC. A summary of these reports will also be included in a post-construction compliance report. Reporting for the pre-construction surveys will include descriptions of the following:

- Survey methods;
- Flagging and signage of Project site, construction area, and roads;

- Flagging of avoidance areas (e.g., active nests, burrows, etc.);
- Sensitive biological resources observed; and
- Impact avoidance measures implemented.

5.2 STAKING AND FLAGGING OF AVOIDANCE AREAS

Avoidance areas will be established for desert tortoise, Mohave ground squirrel, American badger, desert kit fox, and other biological resources (e.g., other species protected under Section 10 of the Migratory Bird Treaty Act [MBTA], Fish and Game Code Sections [2080, 3500 et seq.]), if necessary. Buffer zones will be utilized as needed to the maximum extent practical. The perimeter of the avoidance areas will be fenced with temporary exclusionary fencing or staked with wooden stakes, roughly 3 feet high and approximately 10 feet apart, as appropriate for species. Any Project-related temporary fencing and staking and flagging will be collected and removed following the construction phase of the Project. Avoidance criteria for sensitive species are shown in Table 5-1.

**Table 5-1
Summary of Avoidance Criteria for Sensitive Species**

Species	COC Number	Summary Avoidance Criteria
Nesting birds	BIO-8	During breeding season (Feb. 1 through Aug. 31), active nest avoidance buffer to be determined by DB with CEC in consultation with CDFG and USFWS.
Desert tortoise	BIO-11	Clearance surveys will be performed and detected. DT will be translocated per the method outlined in BIO-11. Install temporary exclusionary fencing.
Mohave ground squirrel	BIO-12	Clearance surveys will be performed and detected. Mohave ground squirrels will be trapped and released per the method outlined in BIO-12. Install temporary exclusionary fencing
Burrowing owl	BIO-13	Avoidance buffer of 250 feet around active burrows during ground-disturbing activities and as discussed in the Burrowing Owl Mitigation Plan (Appendix E).
American badger Desert kit fox	BIO-14	Potentially and definitely active burrows will not be disturbed during the whelping/pupping season (February 1–September 30). If DB verifies a potentially or definitely active den is unoccupied (via the methods described in COC BIO-14) it will then be excavated and backfilled by hand.

Each avoidance area is determined by the criteria presented in Table 5-1 and measured outward from the biological resource. The avoidance areas will be marked no less than five days before

the start of construction in areas adjacent to the resource. Avoidance areas will be monitored and maintained until construction activities are completed, or the potential for adverse impact to the resource has been minimized within the Project site, and then will be removed. If specified avoidance areas cannot be established for any reason, CEC and other appropriate resource agencies will be contacted for guidance prior to ground-disturbing activities on or near the subject resource.

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6.0 BIOLOGICAL RESOURCE MONITORING AND REPORTING

6.1 SCOPE OF COMPLIANCE MONITORING

Construction and operation of the Project will result in potentially significant direct and/or indirect impacts to biological resources. The EPC Contractor Construction Manager, the DB, and Biological Monitors will assist Mojave Solar in conducting the Project in such a manner as to minimize adverse effects to biological resources and in compliance with the COCs.

6.2 COMPLIANCE LEVELS

Mojave Solar will maintain a record system describing the compliance levels and will use it as a tool to help explain, record, and enforce the compliance requirements. The following levels of compliance measurement will be used:

- Compliance
- Notification
- Non-compliance
- Non-compliance resolution report
- Stop task order

These compliance levels and their associated actions are described in Table 6-1. Sample forms for notification, non-compliance reports, and non-compliance resolution reports are provided in Appendix K.

**Table 6-1
Compliance Levels**

Compliance Level	Description
Compliance	Used to identify an action in accordance with all Project requirements.
Notification	Used to identify an action approaching non-compliance. This is like a “fix-it” notice.
Non-Compliance	This term identifies an action that does not comply with a Project requirement; therefore, a non-compliance will be issued. A repeat non-compliance would be noted on the Non-Compliance form as a second occurrence. A Non-Compliance Resolution Report (Appendix K) must be provided to CEC.
Non-Compliance Resolution Report	A report provided to CEC following a non-compliance action that includes a description of the affected resource(s), a summary of corrective actions, and conditions of approval. A sample report form is provided in Appendix K.
Stop Task Order	A third repeated non-compliance and any “serious” non-compliance (e.g., grading through a protected area) would result in a Stop Task Order (other work may continue). A Stop Task Order would require Mojave Solar to meet with appropriate decision makers to determine requirements to correct or resolve the issue and resume activity in the problem area.

6.3 MONTHLY AND YEARLY COMPLIANCE REPORTS

The DB will prepare monthly compliance reports and provide them to Mojave Solar, the CPM, CDFG, and USFWS as appropriate and described in Section 3.1. Monthly compliance reporting would begin at the onset of ground-disturbing activities, such as installation of the desert tortoise exclusionary fencing at the beginning of pre-construction mobilization and continue through construction, with a final construction termination report at the end of construction. After construction, annual compliance reports would be submitted for each year of commercial operation. Monthly reports would no longer be required.

6.3.1 Monthly Compliance Report

The monthly compliance reports (MCRs) will include the following information:

- Areas and activities monitored during the prior month;
- The number of persons who have completed the WEAP training in the prior month, including copy of the sign-off sheet with the signatures of all people who have gone through the training that month for the monthly report.
- Implementation of BRMIMP measures and their implementation methods (Section 3.1);
- Notification forms;
- Summary of records kept by the DB regarding any violations, sensitive resources encountered, and inspection of construction areas;
- Non-compliance reports and proposed remedial measures;
- Observations of invasive weed species, including control measures implemented;
- A list of all species observed during the month (refer to the Wildlife Observation Form in Appendix M);
- Detailed information from desert tortoise surveys (if performed), including a) the locations (narrative and maps) and dates of observation; b) general condition and health, including injuries, state of healing and whether desert tortoise voided their bladders; c) location moved from and location moved to (using Global Positioning System technology); d) gender, carapace length, and diagnostic markings (i.e., identification numbers or marked lateral scutes); e) ambient temperature when handled and released; and f) digital photograph of each handled DT;

-
- A detailed account of any injured or dead sensitive wildlife species, and any special-status plant or wildlife species encountered; and
 - Results of surveys conducted, if any.

6.3.2 Annual Compliance Report

As part of the annual compliance report (ACR) each year following construction, the DB will provide a report to the CPM due on or before January 31 that includes the following information:

- Dates of Project construction;
- Data concerning success and deficiencies in meeting Project mitigation measures, and an explanation of any failure to meet such measures;
- A summary of results from the monthly compliance report, including monitoring results, weed control measures, special-status species observations, etc.;
- Known occurrences of incidental take;
- The effects of construction activities on special-status species, including State or federally listed species and habitats;
- The specific number of habitat acres disturbed;
- Description of specific sensitive resources impacted;
- Description of monitoring of relocated animals; and
- Recommendations for the upcoming year including any remedial measures, if necessary.

In addition, the ACR should include annual reporting information required by the following COCs:

- Tamarisk Eradication, Monitoring, and Reporting Program (BIO-16)
- Monitoring Impacts of Solar Collection Technology on Birds (BIO-17)
- Raven Monitoring, Management, and Control Plan (BIO-18)
- Evaporation Pond Monitoring and Adaptive Management Plan (BIO-19)
- Harper Dry Lake Water Delivery (BIO-20)

6.3.3 Construction Termination Report

Within 30 days after completion of Project construction, Mojave Solar will provide to the CPM, for review and approval, a written construction termination report. This report will include:

- Dates that Project construction occurred;
- Pertinent information concerning the success of the Project in meeting compensation and other conservation measures;
- An explanation of failure to meet such measures, if any;
- Known Project effects on special-status species, if any;
- Occurrences of incidental take of special-status species, if any; and
- Other pertinent information.

6.4 REPORTING PROCEDURES FOR INJURED OR DEAD WILDLIFE

If an injured or dead (including road-kill) sensitive wildlife species is detected within or near the Project area, the DB will immediately notify by phone the CPM, CDFG, and USFWS, and the Project owner will follow the instructions provided by CDFG or USFWS. If CDFG or USFWS cannot be immediately reached, consideration should be given to taking the animal to a veterinary hospital. Notification will occur no later than noon on the business day following the event if it occurs outside normal business hours so that the agencies can determine if further actions are required to protect sensitive wildlife species. The CDFG contact for immediate assistance is State Dispatch at (916) 445-0045. They will contact the local warden or biologist.

Should a tortoise or other wildlife become trapped, the DB or Biological Monitor shall remove and relocate the individual to a safe location. Any wildlife encountered during the course of construction shall be allowed to leave the construction area unharmed. Entrapped animals are addressed as detailed under COC BIO-7 (Table 3-1) and will be reported in the MCRs

In the case of dead or injured animals, written follow-up notification via facsimile or electronic mail (email) will be submitted by the DB (or designated representative) to the appropriate resource agency within three working days of the finding of any such animal(s). Notification will include the date, time, location, species, photograph, cause of death, and any other pertinent information.

If any golden eagles are recovered dead, they will be sent to the National Eagle Repository after cause of death has been investigated.

During construction or operations, any tortoise injured or killed will be reported immediately by phone to USFWS, CDFG, DOE, and CEC and no later than noon on the first business day following the discovery of the injured/killed tortoise; a follow-up written report will be emailed or faxed within 48 hours. Prior to initiation of relocation/translocation, the DB will contact CDFG for the name of an approved veterinarian or wildlife rehabilitation clinic (per BIO-7 [CEC 2010]). If a tortoise is injured, the tortoise will be taken immediately to one of these facilities. If a tortoise is killed, it will be salvaged for necropsy.

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7.0 POST-CONSTRUCTION CLEANUP AND LANDSCAPING

Upon completion of construction, all areas subject to ground disturbance, including storage and staging areas, pipeline corridors, transmission line tower pads, etc., will be cleaned up and reclaimed to pre-construction conditions to the maximum extent practical. The cleanup will consist of removal of all stakes, lath, flagging, barrels, cans, drums, accidental spills, and any other refuse generated by construction. Temporary impact areas will be returned to grade, but per the project design, no revegetation or restoration of temporary impact areas is needed and per project COC's and permits, no revegetation or restoration of temporary impact areas is required. Invasive nonnative species shall not be used in landscaping plans.

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8.0 MEASURES REQUIRED DURING PROJECT OPERATION

8.1 GENERAL MEASURES REQUIRED DURING PROJECT OPERATION

The following general mitigation measures will be implemented to reduce potential impacts to biological resources.

- New personnel to the Project site or contractors that have not received WEAP training regarding sensitive biological resources in the Project vicinity will be trained within one week of arrival on the Project site. In addition, all workers will receive WEAP training in sensitive biological resources annually. Upon completion of the training, employees will sign a form stating that they attended the program and understand all Project-related mitigation measures. These forms will be filed at Mojave Solar offices.
- All food-related trash items will be disposed of in closed containers and removed at least once a week from the Project site.
- There is no feeding of wildlife.
- No firearms will be allowed on the Project site.
- No pets will be allowed on the Project site.
- Smoking in designated areas only and disposed of in the proper container.
- Report wildlife injury and mortality.
- Minimize standing water.
- Minimize spills of hazardous materials.
- Implement erosion control measures.

8.2 TAMARISK ERADICATION, MONITORING, AND REPORTING PROGRAM

The Project owner will ensure effective removal of tamarisk by designing and implementing a monitoring and reporting plan (Appendix F). The plan will include proposed methods for tamarisk removal and treatment, monitoring and maintenance procedures/timeline, irrigation, success standards and contingency measures, and monitoring and maintenance objectives to prevent the reinvasion of undesirable weeds and/or invasive wildlife species for a minimum of 5 years. This plan will include identification on a map of each location and size of nonnative

vegetation to be removed, and the methods proposed to remove and dispose of invasive wildlife species. Exotic, nonnative, and invasive species removal will be conducted throughout the monitoring and maintenance period. Prior to any tree removal, it will be verified that there are no nesting raptors or other MBTA-protected birds. For the CPM and CDFG to deem tamarisk eradication successful 1) the site will not contain more than 5 percent exotic plant species, 2) all plant species with rates of dispersal and establishment listed as "high" or "moderate" on the California Invasive Plant Inventory will have documented absence, or have been removed from the site at least three years, and 3) the site will not contain invasive wildlife species.

The Project owner will submit to the CPM a copy of the Tamarisk Eradication Monitoring and Reporting Plan, approved by CEC and CDFG, 30 days prior to any construction-related activities.

Monitoring and maintenance of the site will be conducted for a minimum five years. Following the first year of monitoring, if the Project owner petitions to terminate the monitoring program, CEC staff and CDFG will determine whether more years of monitoring are needed. The DB will submit ACRs to the CPM and CDFG describing dates, durations, and results of monitoring. The reports will fully describe the status of the tamarisk at the eradication site and will describe any actions taken to remedy regrowth.

8.3 MONITORING IMPACTS OF SOLAR COLLECTION TECHNOLOGY ON BIRDS

The Project owner will prepare and implement a Bird Monitoring Study (Appendix G) to monitor the death and injury of birds from collisions with facility features such as reflective mirror-like surfaces and from heat, and bright light from concentrating sunlight. The study design will be approved by the CPM in consultation with CDFG and USFWS, and will be incorporated into the Project's BRMIMP and implemented. The Bird Monitoring Study will include detailed specification on data and carcass collection protocol and rationale for justifying the proposed schedule or carcass searches. The study will also include seasonal trials to assess bias from carcass removal by scavengers as well as searcher bias.

At least 60 days prior to commercial operation of the plant, the Project owner will submit to the CPM, USFWS, and CDFG a draft Bird Monitoring Study. The CPM shall review and provide written comments within 15 days of receipt of the Bird Monitoring Study. At least 30 days prior to the start of plant commercial operation, the Project owner will provide the CPM with the final version of the Bird Monitoring Study that has been reviewed and approved by the CPM, in consultation with CDFG and USFWS. All modifications to the Bird Monitoring Study will be made only after approved by the CPM. For at least two years following the beginning of

operation, the DB will submit quarterly reports to the CPM, CDFG, and USFWS describing the dates, durations, and results of monitoring. The quarterly reports will provide a detailed description of any Project-related bird or wildlife deaths or injuries detected during the monitoring study or at any other time.

Following the fourth quarter of monitoring, the DB will prepare an Annual Report that summarizes the year's data, analyzes any Project-related bird fatalities or injuries detected, and provides recommendation for future monitoring and any adaptive management actions needed. The Annual Report will be provided to the CPM, CDFG, and USFWS.

8.4 COMMON RAVEN MONITORING, MANAGEMENT, AND CONTROL

The Project owner will implement a Raven Monitoring, Management, and Control Plan (Raven Plan, included in Appendix H) that is consistent with the most current USFWS-approved raven management guidelines and that meets the approval of USFWS, CDFG, and CEC staff. The Raven Plan will include but not be limited to a program to monitor raven presence in the Project vicinity, determine if raven numbers are increasing, and implement raven control measures as needed based on that monitoring. The purpose of the plan is to avoid any Project-related increases in raven numbers during construction, operation, and decommissioning. The Applicant will also provide funding for implementation of the USFWS Regional Raven Management Program by submitting payment to the Project subaccount of the REAT Account held by the National Fish and Wildlife Foundation to support the USFWS Regional Raven Management Program. The amount will be one-time payment of \$105 per acre of land permanently disturbed by the Project.

No less than 10 days prior to the start of any Project-related ground disturbance activities, the Project owner will provide the CPM, USFWS, and CDFG with the final version of a Raven Plan. Prior to the start of any Project-related ground disturbance activities, the Applicant will provide documentation to the CPM, BLM, CDFG, and USFWS that the one-time fee for the USFWS Regional Raven Management Program has been deposited to the REAT-NFWS subaccount for the Project.

Within 30 days after completion of Project construction, the Project owner will provide to the CPM for review and approval a report identifying which items of the Raven Plan have been completed, a summary of all modification to mitigation measures made during the Project's construction phase, and which items are still outstanding.

8.5 EVAPORATION POND MONITORING AND ADAPTIVE MANAGEMENT PLAN

The Project owner will design and implement an Evaporation Pond Monitoring and Adaptive Management Plan (Appendix I) that meets the requirements of USFWS, CDFG, RWQCB, and the CPM. The objective of the plan is to define the monitoring and reporting procedures as well as triggers for adaptive management strategies that will be implemented to prevent wildlife mortality at the evaporation ponds. The plan will include a description of evaporation pond design features such as side slope specifications, and freeboard and depth requirements, which will prevent use by wildlife; and a detailed description of the wildlife monitoring procedures and schedule. For the initial implementation of a new technology, daily monitoring will be conducted both at the Project evaporation ponds and the wetlands within the Harper Lake ACEC. Monitoring may be reduced to weekly and potentially every two weeks or monthly depending on the results of the initial monitoring period. A detailed description of the water quality and water level monitoring procedures and schedule, water quality, and water level monitoring will coincide with wildlife monitoring to provide a basis for comparative analysis. A description of wildlife exclusion/deterrent technologies and adaptive management strategies will be included. Technologies will include but are not limited to netting and will not disturb or harass non-target wildlife adjacent to the Project Area. The plan will include triggers for adaptive management (i.e., modifications to existing technology or replacement with new technology). Adaptive management will be necessary if 1) more than one dead bird per quarter is discovered at the evaporation ponds; or 2) one special-status animal is discovered at the evaporation ponds; or 3) noise levels attributable to the technology exceed 60 dB at the Harper Lake ACEC wetlands. After three failed attempts at new technology or modification of existing technology, the ponds will be netted.

Reporting requirements should include monthly reporting for the first year if a technology other than netting is used. Reporting may be reduced to monthly or quarterly thereafter if no bird or wildlife deaths are reported during the first year. If wildlife mortality occurs at the ponds or if birds are disturbed at the marsh as described above, the CPM will be notified with 10 days of the incident and the accompanying adaptive management action to be implemented. Evaporation pond monitoring and reporting shall continue for the life of the project.

8.6 HARPER DRY LAKE WATER DELIVERY

To ensure continuity of water delivery to the Harper Dry Lake ACEC, the Project owner will not decommission the existing well on Mojave Solar-owned property that currently serves the

Harper Dry Lake marsh (wetland well) until an alternate well is able to effectively convey a minimum of 75 acre-feet per year to the Harper Dry Lake marsh. Fifteen days prior to decommissioning the wetland well, the Project owner will provide proof, to the satisfaction of the CPM, that the alternate well is completed and able to effectively convey a minimum of 75 acre-feet per year to the Harper Dry Lake marsh. Proof will include, but not be limited to, a description of the well parameters as constructed.

8.7 RECORDKEEPING

The frequency and record keeping standards described for Project construction activities will also be followed for maintaining employee training records and environmental compliance reports during operations.

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9.0 MEASURES REQUIRED FOR CLOSURE

At some point in the future, the Project will cease operation and close down. At that time, it will be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the Project setting for this Project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the Project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and Project setting that exists at the time of closure. Facility closure will be consistent with laws, ordinances, regulations, and standards in effect at the time of closure. There are at least three circumstances in which a facility closure can take place:

- **Planned Closure** – A planned closure occurs when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.
- **Unplanned Temporary Closure** – An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency.
- **Unplanned Permanent Closure** – An unplanned permanent closure occurs if the Project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner implements the on-site contingency plan. It can also include unplanned closure where the Project owner fails to implement the contingency plan, and the Project is essentially abandoned.

9.1 PLANNED CLOSURE

To ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned Project closure, the Project owner will submit a proposed facility closure plan to CEC for review and approval at least 12 months (or other period of time agreed to by the CPM) prior to commencement of closure activities. It will include take avoidance and mitigation requirements applicable to the sensitive biological resources within the Project site at that time. The plan will also include the reclamation of areas where facilities would be removed, including transmission conductors and all other facilities in

order to restore wildlife habitat and promote the reestablishment of wildlife species and plants to pre-construction conditions.

9.2 UNPLANNED TEMPORARY CLOSURE/ON-SITE CONTINGENCY PLAN

To ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner. The Project owner will submit an on-site contingency plan for CPM review and approval. The plan will be submitted no less than 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and will be kept at the site at all times.

In the case of temporary closure, measures to protect biological resources would be needed only if there were surface disturbances or releases of harmful materials. If such an event occurs, Mojave Solar will consult with the responsible agencies to plan cleanup and mitigation of impacts to biological resources.

9.3 UNPLANNED PERMANENT CLOSURE/ON-SITE CONTINGENCY PLAN

The on-site contingency plan required for unplanned temporary closure will also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure will also apply to unplanned permanent closure. In addition, the on-site contingency plan will address how the Project owner will ensure that all required closure steps will be successfully undertaken in the event of abandonment. In the event of an unplanned permanent closure, the Project owner will notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and will take all necessary steps to implement the on-site contingency plan. The Project owner will keep the CPM informed of the status of all closure activities.

In the case of unplanned permanent closure, Mojave Solar will consult with the responsible agencies to plan cleanup and mitigation of impacts to biological resources in order to restore wildlife habitat and promote the reestablishment of wildlife species and plants to pre-construction conditions.

9.4 REPORTING OF CLOSURE ACTIVITIES

Compliance reporting for closure activities will be submitted to the CPM within 30 days after completion of the Project and will include the following:

- BRMIMP items that have been completed;
- A summary of all modifications to mitigation measures made during the Project's mobilization, ground disturbance, grading, and construction phases; and
- Any outstanding mitigation and monitoring items.

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10.0 REFERENCES

AECOM

- 2010 Common Raven Monitoring and Control Plan Mojave Solar Project. Prepared for Mojave Solar I, LLC, Victorville, CA. September.

California Energy Commission (CEC)

- 2010 Mojave Solar Project Commission Decision CEC-800-2010-008-CMF Docket Number 09-AFC-5. September 15. Available at <http://www.energy.ca.gov/2010publications/CEC-800-2010-008/CEC-800-2010-008-CMF.pdf>.

Mojave Solar, LLC

- 2009 Application for Certification for the Mojave Solar Project. July.
2011 Biological Assessment Mojave Solar Project. March.

Pagel, J.E., D.M. Whittington, and G.T. Allen.

- 2010 Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations

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FIGURES



Source: Mojave Solar, LLC 2010; ESRI 2010

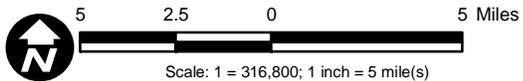
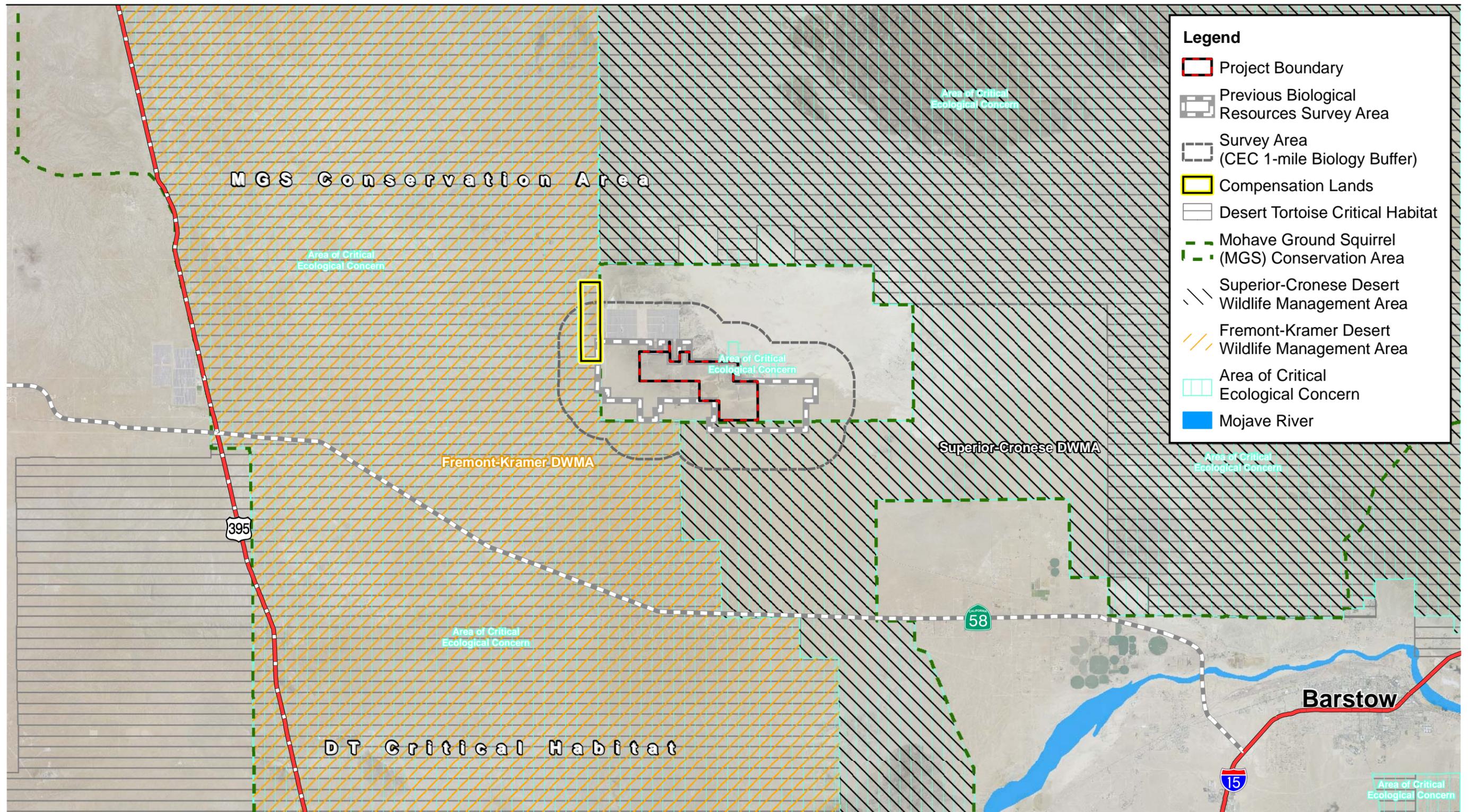


Figure 1
Regional Map



Source: NAIP 2005; USFWS 2006; BLM 2009; Mojave Solar, LLC 2009; BLM 2010

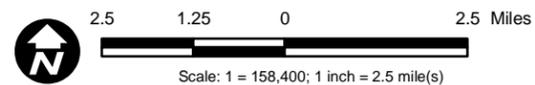
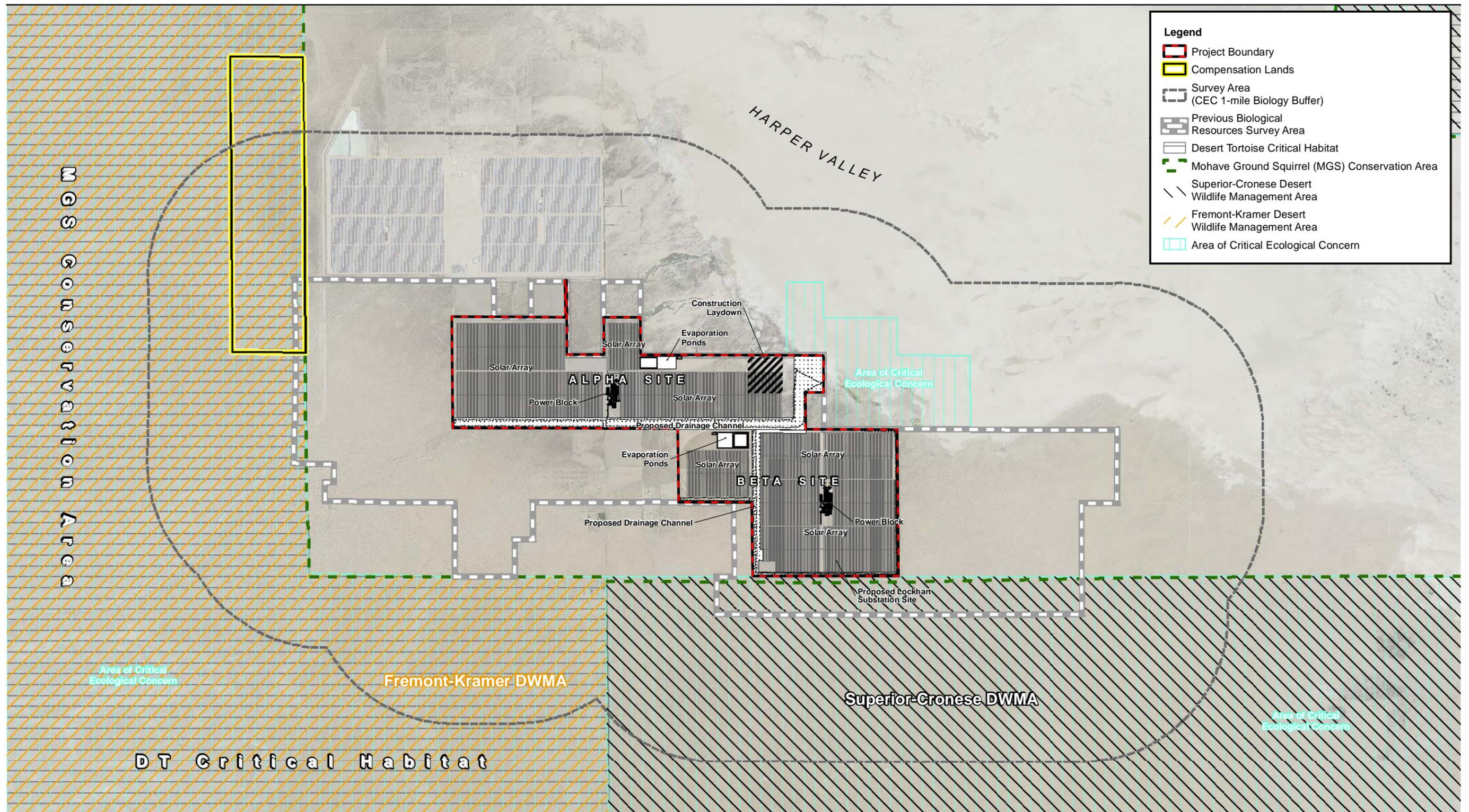


Figure 2
Vicinity Map



Source: NAIP 2005; USFWS 2006; BLM 2009; Mojave Solar, LLC 2009; BLM 2010

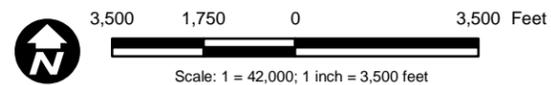
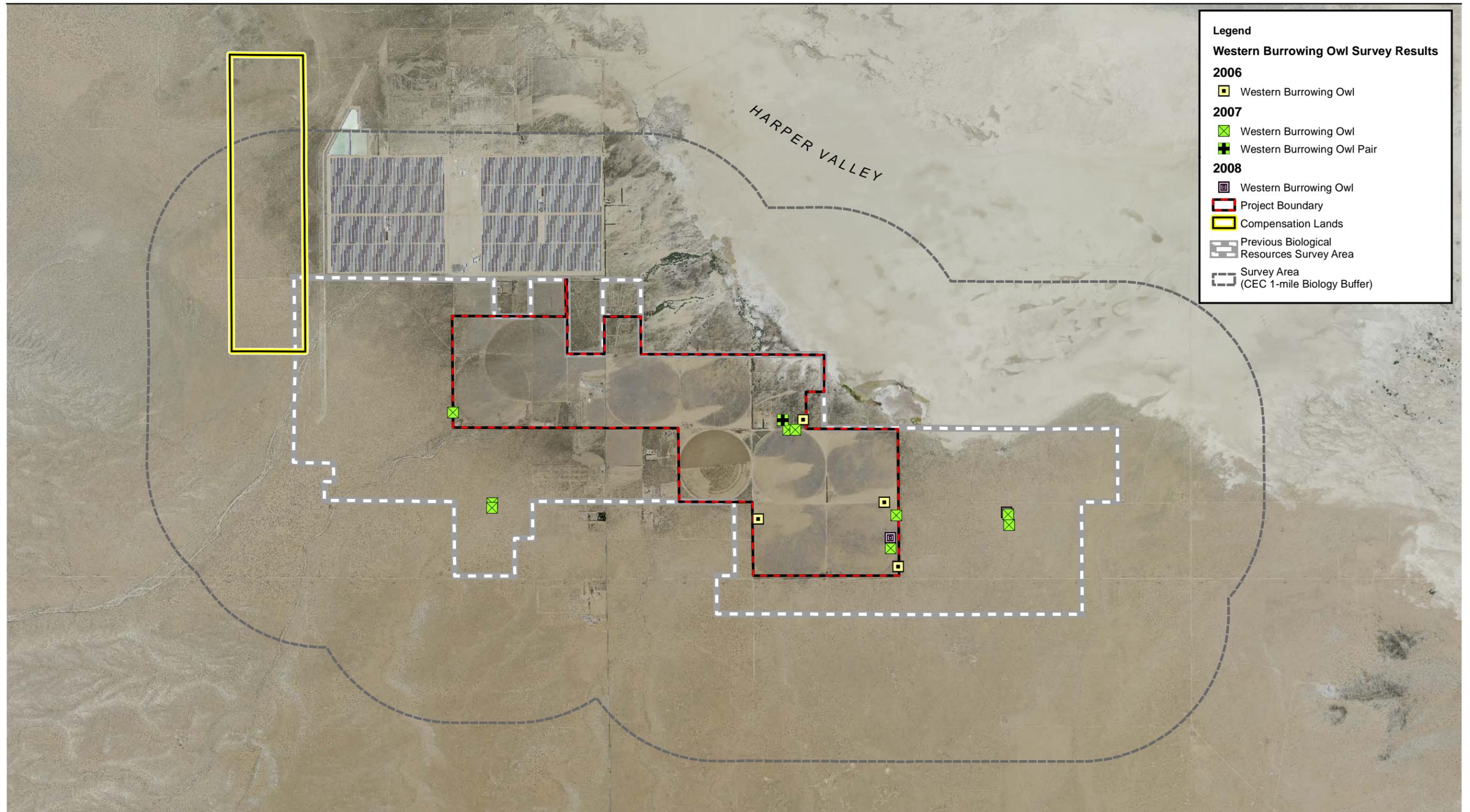


Figure 3
Plant Site Layout



Legend

Western Burrowing Owl Survey Results

2006

- Western Burrowing Owl

2007

- Western Burrowing Owl
- Western Burrowing Owl Pair

2008

- Western Burrowing Owl

Project Boundary

Compensation Lands

Previous Biological Resources Survey Area

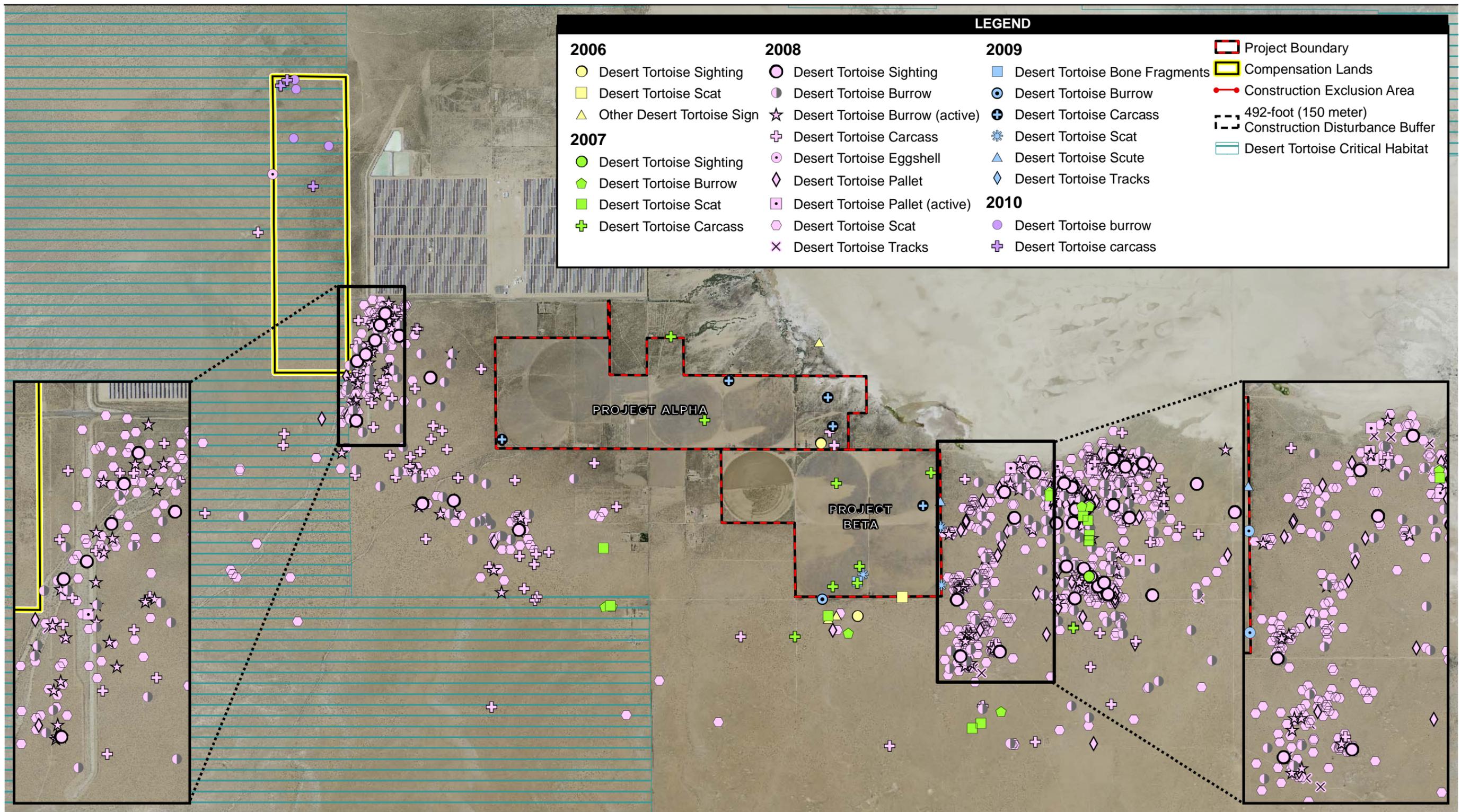
Survey Area (CEC 1-mile Biology Buffer)

Source: NAIP 2009; Mojave Solar, LLC 2009; AECOM 2009

3,500 1,750 0 3,500 Feet

Scale: 1 = 42,000; 1 inch = 3,500 feet

Figure 4
Burrowing Owl Observations



Source: NAIP 2009; BLM 2009; Mojave Solar, LLC 2009; San Bernardino County 2009; AECOM 2006-2010

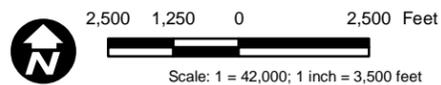
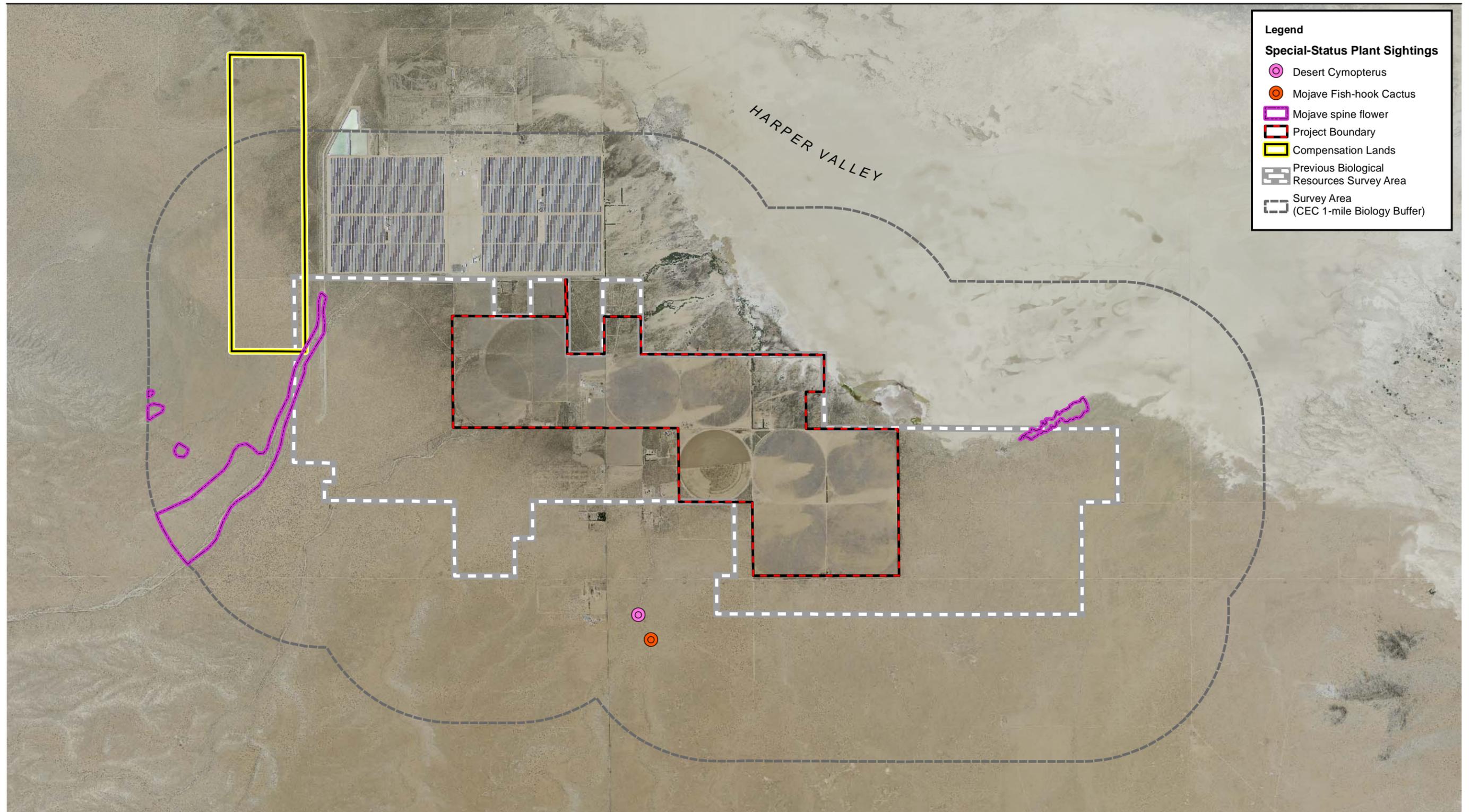


Figure 5
Desert Tortoise Occurrences (2006-2010)



Source: NAIP 2009; Mojave Solar, LLC 2009; AECOM 2009

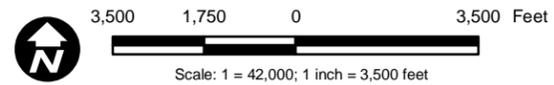
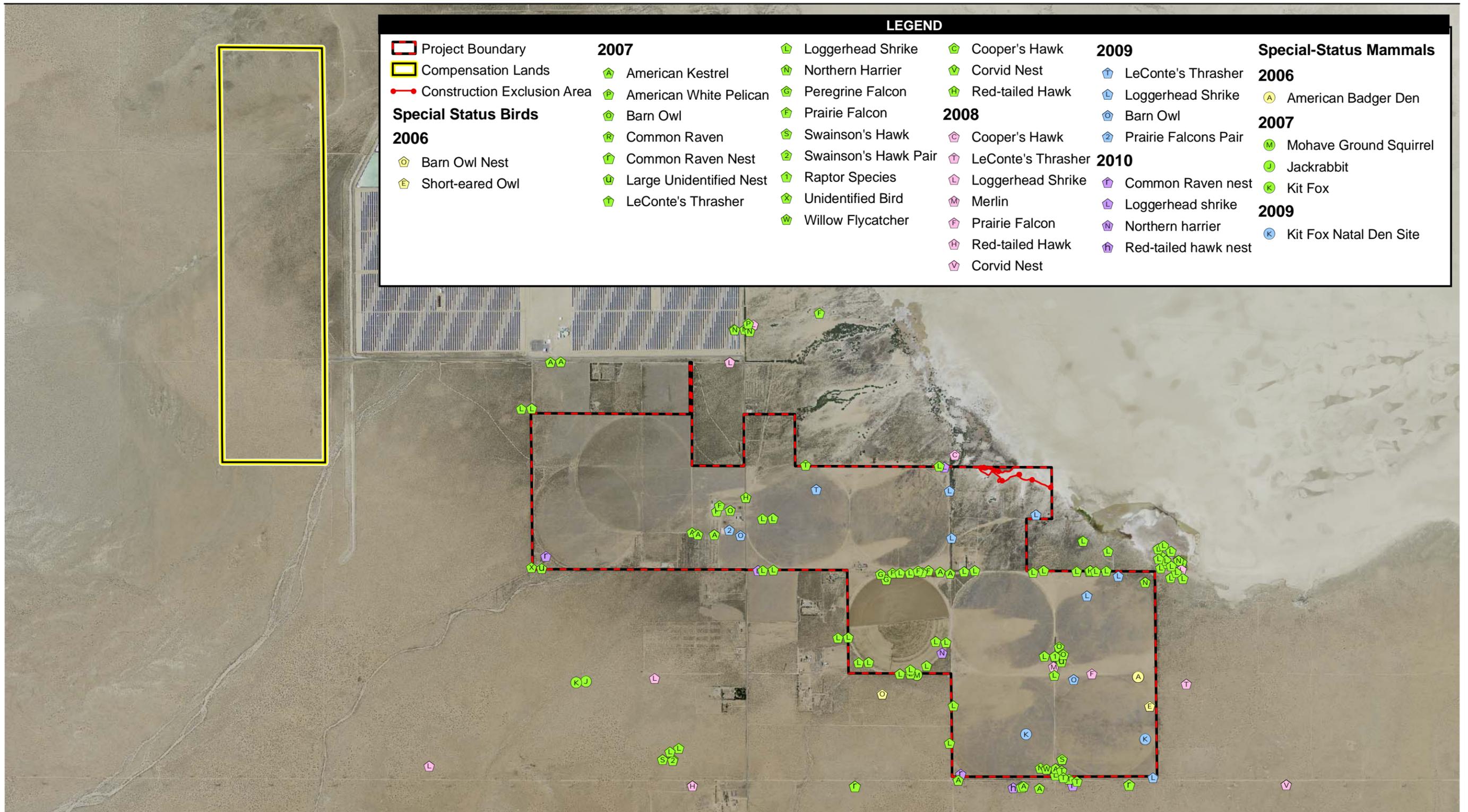


Figure 6
Special-Status Plant Occurrences



Source: NAIP 2009; BLM 2009; Mojave Solar, LLC 2009; San Bernardino County 2009; AECOM 2006-2010

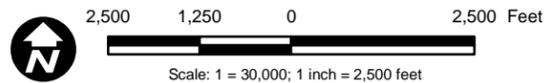


Figure 7
Other Special-Status Species Occurrences (2006-2010)

APPENDIX A

**FINAL DECISION CONDITIONS OF CERTIFICATIONS
CONDITIONS: BIOLOGICAL RESOURCES**

CONDITIONS OF CERTIFICATION

Designated Biologist Selection

BIO-1 The project owner shall assign a Designated Biologist to the project. The project owner shall submit the resume of the proposed Designated Biologist, with at least three references and contact information, to the Energy Commission Compliance Project Manager (CPM), CDFG, and USFWS for approval.

The Designated Biologist must meet the following minimum qualifications:

1. Bachelor's Degree in biological sciences, zoology, botany, ecology, or a closely related field; and
2. 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;
3. At least one year of field experience with biological resources found in or near the project area;
4. Meet current USFWS Authorized Biologist criteria³² and demonstrate familiarity with protocols and guidelines for the desert tortoise; and
5. Possess a recovery permit for desert tortoise and a California ESA Memorandum of Understanding pursuant to Section 2081(a) for desert tortoise and Mohave ground squirrel or have adequate experience and qualifications to obtain these authorizations. It is possible that two biologists may be utilized – each with an MOU for desert tortoise or MGS.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM, that the proposed Designated Biologist or alternate has the appropriate training and background to effectively implement the conditions of certification.

³² USFWS designates biologists who are approved to handle tortoises as "Authorized Biologists." Such biologists have demonstrated to USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately, and have received USFWS approval. Authorized Biologists are permitted to then approve specific monitors to handle tortoises, at their discretion. CDFG must also approve such biologists, potentially including individual approvals for monitors approved by the Authorized Biologist. Designated Biologists are the equivalent of Authorized Biologists. Only Designated Biologists and certain Biological Monitors who have been approved by the Designated Biologist would be allowed to handle desert tortoises.

Verification: The project owner shall submit the specified information at least 60 days prior to the start of any pre-construction site mobilization. The CPM, CDFG, and USFWS have 30 days to approve or deny proposed Designated Biologist(s). No site or related facility activities shall commence until an approved Designated Biologist is available to be on site.

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to the CPM at least 10 working days prior to the termination or release of the preceding Designated Biologist. In an emergency, the project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to the CPM for consideration.

Designated Biologist Duties

BIO-2 The project owner shall ensure that the Designated Biologist performs the following during any site (or related facilities) mobilization, ground disturbance, grading, construction, operation, and closure activities. The Designated Biologist may be assisted by the approved Biological Monitor(s), but remains the contact for the project owner and CPM.

1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources conditions of certification;
2. Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), to be submitted by the project owner;
3. Be available to supervise, conduct and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as special status species or their habitat;
4. Halt any and all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued or a violation of federal or state environmental laws or a violation of any environmental agreements/conditions made between the applicant and the CPM and/or the regulatory agencies;
5. Clearly mark sensitive biological resource areas, if present and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;

6. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (i.e. parking lots) for animals in harm's way;
7. Notify the project owner and the CPM of any non-compliance with any biological resources condition of certification;
8. Respond directly to inquiries of the CPM regarding biological resource issues;
9. Maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the Monthly Compliance Report and the Annual Report; and
10. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training and all permits.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to the CPM copies of all written reports and summaries that document biological resource compliance activities, including those conducted by Biological Monitors.

If actions may affect biological resources during operation, a Designated Biologist or Biological Monitor under the supervision of the Designated Biologist shall be available for monitoring and reporting.

During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless their duties are ceased as approved by the CPM. Monthly and Annual Compliance Reports shall be also be submitted to CDFG and USFWS.

Biological Monitor Selection, Qualifications, and Duties

BIO-3 The project owner's CPM-approved Designated Biologist shall submit the resume, at least three references and contact information, of the proposed Biological Monitors to the CPM, CDFG, and USFWS for approval. The resume shall demonstrate to the satisfaction of the CPM, the appropriate education and experience to accomplish the assigned biological resource tasks, including:

- Biological Monitor(s) involved in any aspect of desert tortoise surveys or handling must meet the criteria to be considered a USFWS Authorized Biologist (USFWS 2008) and demonstrate familiarity with the most recent protocols and guidelines for the desert tortoise.
- Biological Monitor(s) involved in any aspect of Mohave ground squirrel surveys or handling must possess a California ESA Memorandum of Understanding pursuant to Section 2081(a) for Mohave ground squirrel or have adequate experience and qualifications to obtain this authorizations.
- Biological Monitor(s) training by the Designated Biologist shall include familiarity with the conditions of certification and the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), Worker Environmental Awareness Program (WEAP), and all permits.
- The Biological Monitors shall assist the Designated Biologist in conducting surveys and in monitoring of site mobilization activities, construction-related ground disturbance, grading, boring or trenching. The Designated Biologist shall remain the contact for the Project owner, BLM's Authorized Officer and the CPM.

Verification: The project owner shall submit the specified information to the CPM, CDFG, and USFWS for approval at least 60 days prior to the start of any pre-construction site mobilization, and concurrent with the submittal of information required for the Designated Biologist approval process outlined in BIO-1. The CPM, CDFG, and USFWS have 30 days to approve or deny proposed Biological Monitor(s).

The Designated Biologist shall submit a written statement to the CPM confirming that the individual Biological Monitor(s) have been trained including the date when training was completed.

If additional biological monitors are needed during construction, the specified information shall be submitted to the CPM for approval 10 days prior to their first day of monitoring activities.

Designated Biologist and Biological Monitor Authority

BIO-4 The project owner's Construction/Operation Manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources conditions of certification.

If required by the Designated Biologist and Biological Monitor(s) the project owner's Construction/Operation Manager shall halt all site

mobilization, ground disturbance, grading, construction, and operation activities in areas specified by the Designated Biologist.

The Designated Biologist shall:

1. Halt any and all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued or a violation of federal or state environmental laws or a violation of any environmental agreements/conditions made between the applicant and the CPM and/or the regulatory agencies;
2. Inform the project owner and the Construction/Operation Manager when to resume activities; and
3. Notify the CPM if there is a halt of any activities, and advise the CPM of any corrective actions that have been taken, or will be instituted, as a result of the work stoppage.
4. If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist. It is expected that the Designated Biologist will be onsite during construction or otherwise available by phone.

Verification: The project owner shall ensure that the Designated Biologist or Biological Monitor notifies the CPM immediately (and no later than the following morning of the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, ground disturbance, grading, construction, and operation activities. The project owner shall notify the CPM of the circumstances and actions being taken to resolve the problem.

Whenever corrective action is taken by the project owner, a determination of success or failure will be made by the CPM within five working days after receipt of notice that corrective action is completed, or the project owner will be notified by the CPM that coordination with other agencies will require additional time before a determination can be made.

Worker Environmental Awareness Program

BIO-5 The project owner shall develop and implement a CPM-approved Worker Environmental Awareness Program (WEAP) in which each of its employees, as well as employees of contractors and subcontractors who work on the project site or any related facilities during site mobilization, ground disturbance, grading, construction, operation, and closure are informed about sensitive biological resources associated with the project.

The WEAP must:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material and electronic media is made available to all participants;
2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas, if present;
3. Present the reasons for protecting these resources;
4. Present the meaning of various temporary and permanent habitat protection measures as necessary;
5. Discuss penalties for violation of applicable LORS (e.g., federal and state endangered species acts);
6. Identify whom to contact if there are further comments and questions about the material discussed in the program; and
7. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

The specific program can be administered by a competent individual(s) acceptable to the Designated Biologist.

Verification: At least 45 days prior to the start of any pre-construction site mobilization, the project owner shall provide to the CPM the proposed WEAP and all supporting written materials and electronic media prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program. The CPM shall review and provide written comments within 15 days of receipt of the WEAP.

The project owner shall provide in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date. At least 10 days prior to site and related facilities mobilization submit two copies of the CPM-approved materials.

Training acknowledgement forms signed during construction shall be kept on file by the project owner for a period of at least six months after the start of commercial operation.

During project operation, signed statements for operational personnel shall be kept on file for six months following the termination of an individual's employment.

Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) Development and Compliance

BIO-6 The project owner shall develop a BRMIMP and submit two copies of the proposed BRMIMP to the CPM (for review and approval) and to CDFG and USFWS (for review and comment) if applicable and shall implement the measures identified in the approved BRMIMP. A copy of the BRMIMP shall be kept onsite and made readily available to biologists, regulatory agencies, the project owner, contractors, and subcontractors as needed.

The BRMIMP shall be prepared in consultation with the Designated Biologist and shall identify:

1. All biological resource mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;
2. All applicant-proposed mitigation measures presented in the Application for Certification, data request responses, and workshop responses;
3. All biological resource conditions of certification identified as necessary to avoid or mitigate impacts;
4. All biological resource mitigation, monitoring, and compliance measures required in federal agency terms and conditions, such as those provided in the Biological Opinion;
5. All biological resource mitigation, monitoring, and compliance measures required in local agency permits, such as site grading and landscaping requirements;
6. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation, and closure;
7. All required mitigation measures for each sensitive biological resource;
8. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;
9. All locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction;
10. Aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities — one set prior to

any site (and related facilities) mobilization disturbance and one set subsequent to completion of project construction. Include planned timing of aerial photography and a description of why times were chosen;

11. Duration for each type of monitoring and a description of monitoring methodologies and frequency;
12. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;
13. All performance standards and remedial measures to be implemented if performance standards are not met;
14. A preliminary discussion of biological resources-related facility closure measures; and
15. A process for proposing plan modifications to the CPM and appropriate agencies for review and approval.

Verification: The project owner shall provide the specified document at least 45 days prior to start of any pre-construction site mobilization.

The CPM, in consultation with other appropriate agencies, will determine the BRMIMP's acceptability within 30 days of receipt. If there are any permits that have not yet been received when the BRMIMP is first submitted, these permits shall be submitted to the CPM within 5 days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit condition within 10 days of their receipt by the project owner. Ten days prior to pre-construction site mobilization the revised BRMIMP shall be resubmitted to the CPM. Site mobilization will not occur without an approved BRMIMP.

The project owner shall notify the CPM no less than five working days before implementing any modifications to the approved BRMIMP to obtain CPM approval.

Any changes to the approved BRMIMP must also be approved by the CPM in consultation with other appropriate agencies to ensure no conflicts exist.

Implementation of BRMIMP measures will be reported in the Monthly Compliance Reports by the Designated Biologist (i.e., survey results, construction activities that were monitored, species observed). Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction closure report identifying which items of the BRMIMP have been completed, a summary of all modifications to mitigation measures made during the project's site mobilization, ground disturbance, grading, and construction phases, and which mitigation and monitoring items are still outstanding.

Impact Avoidance and Minimization Measures

BIO-7 The project owner shall implement the following measures during construction and operation to manage their project site and related facilities in a manner to avoid or minimize impacts to the local biological resources:

1. Limit Disturbance Area. The boundaries of all areas to be temporarily or permanently disturbed (including staging areas, access roads, and sites for temporary placement of spoils) shall be delineated with stakes and flagging prior to construction activities in consultation with the Designated Biologist. Spoils shall be stockpiled in disturbed areas, which do not provide habitat for special-status species. Parking areas, staging and disposal site locations shall similarly be located in areas without native vegetation or special-status species habitat. All disturbances, vehicles, and equipment shall be confined to the flagged areas.
2. Minimize Road Impacts. New and existing roads that are planned for construction, widening, or other improvements shall not extend beyond the flagged impact area as described above. All vehicles passing or turning around will do so within the planned impact area or in previously disturbed areas. Where new access is required outside of existing roads (e.g. new spur roads) or the construction zone, the route will be clearly marked (i.e., flagged and/or staked) prior to the onset of construction.
3. Minimize Traffic Impacts. Vehicular traffic during project construction and operation shall be confined to existing routes of travel to and from the project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit shall not exceed 25 miles per hour on Harper Lake Road and within fenced areas that have been cleared of tortoises and other wildlife. The speed limit shall not exceed 15 miles per hour within unfenced areas and secondary unpaved access roads.
4. Monitor During Construction. The Designated Biologist or Biological Monitor shall be present at the construction site during all project activities that have potential to disturb soil, vegetation, and wildlife. The USFWS-approved Designated Biologist or Biological Monitor shall closely monitor vegetation removal and grading activities to prevent wildlife injury or mortality.
5. Minimize Impacts of Transmission/Pipeline Alignments, Roads, Staging Areas. Staging areas for construction on the plant site shall be within the area that has been fenced with desert tortoise exclusion fencing and cleared. Temporary disturbance areas, if

necessary, shall occur within the project site and shall be designed, installed, and maintained with the goal of minimizing disturbance. Transmission lines and all electrical components shall be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) *Suggested Practices for Avian Protection on Power Lines* (APLIC 2006) and *Mitigating Bird Collisions with Power Lines* (APLIC 2004) to reduce the likelihood of bird electrocutions and collisions.

6. Avoid Use of Toxic Substances. Road surfacing and sealants as well as soil bonding and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants.
7. Minimize Lighting Impacts. Facility lighting shall be designed, installed, and maintained to prevent side casting of light towards the project boundaries and the Harper Dry Lake marsh. Lighting shall be shielded, directional, and at the lowest intensity required for activity.
8. Avoid Vehicle Impacts to Desert Tortoise. Parking and storage shall occur within desert tortoise exclusion fencing to the extent feasible. No vehicles or construction equipment parked outside the fenced area shall be moved prior to an inspection of the ground beneath the vehicle for the presence of desert tortoise. During construction, a Biological Monitor shall drive along project access roads, particularly Harper Lake Road at least every three hours during the desert tortoise active period (April through May and September through October) looking for desert tortoise or other vulnerable wildlife within the roadway. Outside of the active period, roads shall be monitored at least twice a day in advance of peak AM and PM traffic periods. During operation, employees shall report any desert tortoise sightings along roadways to the Biological Monitor. If a desert tortoise is observed in the roadway or beneath a parked vehicle, it will be left to move on its own or a Biological Monitor may remove and transfer the animal to a safe location if temperatures are within the appropriate range as identified in the Final Desert Tortoise Clearing and Translocation Plan.
9. Avoid Wildlife Pitfalls. At the end of each work day, the Designated Biologist shall ensure that all potential wildlife pitfalls (trenches, bores, and other excavations) outside the permanently fenced area have been backfilled. If backfilling is not feasible, all trenches, bores, and other excavations shall be sloped at a 3:1 ratio at the ends to provide wildlife escape ramps, or covered completely to prevent wildlife access, or fully enclosed with tortoise-exclusion fencing. All trenches, bores, and other excavations outside the

areas permanently fenced with desert tortoise exclusion fencing shall be inspected at the beginning of each workday, periodically throughout, and at the end of each workday by the Designated Biologist or a Biological Monitor. Should a tortoise or other wildlife become trapped, the Designated Biologist or Biological Monitor shall remove and relocate the individual to a safe location. Any wildlife encountered during the course of construction shall be allowed to leave the construction area unharmed.

10. Avoid Entrapment of Wildlife. Any construction pipe, culvert, or similar structure with a diameter greater than three inches, stored less than eight inches above ground for one or more days/nights, shall be inspected for wildlife before the material is moved, buried, or capped. As an alternative, all such structures may be capped before being stored, or placed on pipe racks.
11. Report Wildlife Injury and Mortality. Report all inadvertent deaths of sensitive species to the appropriate project representative, including road kill. Species name, physical characteristics of the animal (sex, age class, length, weight), and other pertinent information shall be noted and reported in the Monthly Compliance Reports. Injured animals shall be reported to CDFG or USFWS and the CPM and the project owner shall follow instructions that are provided by CDFG or USFWS. If CDFG or USFWS cannot be immediately reached, consideration should be given to taking the animal to a veterinary hospital. If any golden eagles are recovered dead, they shall be sent to the National Eagle Repository after cause of death has been investigated.
12. Minimize Standing Water. Water applied to dirt roads and construction areas (trenches or spoil piles) for dust abatement shall use the minimal amount needed to meet safety and air quality standards in an effort to prevent the formation of puddles, which could attract desert tortoises, common ravens, and other wildlife to construction sites. A Biological Monitor shall patrol these areas to ensure water does not puddle and attract desert tortoise, common ravens, and other wildlife to the site and shall take appropriate action to reduce water application where necessary.
13. Minimize Spills of Hazardous Materials. All vehicles and equipment shall be maintained in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The Designated Biologist shall be informed of any hazardous spills immediately as directed in the project Hazardous Materials Plan. Hazardous spills shall be immediately cleaned up and the contaminated soil properly disposed of at a licensed facility. Servicing of construction

equipment shall take place only at a designated area. Service/maintenance vehicles shall carry a bucket and pads to absorb leaks or spills.

14. Worker Guidelines. During construction all trash and food-related waste shall be placed in self-closing containers and removed daily from the site. Workers shall not feed wildlife or bring pets to the project site. Except for law enforcement personnel, no workers or visitors to the site shall bring firearms or weapons.
15. Avoid Spread of Noxious Weeds. The project owner shall implement the following Best Management Practices during construction and operation to prevent the spread and propagation of noxious weeds:
 - A. Limit the size of any vegetation and/or ground disturbance to the absolute minimum and limit ingress and egress to defined routes;
 - B. Reestablish vegetation quickly on disturbed sites temporarily disturbed areas, including pipelines, transmission lines, and staging areas (see **BIO-9**);
 - C. Prevent spread of non-native plants via vehicular sources by implementing Trackclean™ or other methods of vehicle cleaning for vehicles coming and going from construction sites. Earth-moving equipment and construction vehicles shall be cleaned within an approved area or commercial facility prior to transport to the construction site. The number of cleaning stations shall be limited and weed control/herbicide application shall be used at the cleaning station(s);
 - D. Use only weed-free straw, hay bales, and seed for erosion control and sediment barrier installations;
 - E. Invasive non-native species shall not be used in landscaping plans and erosion control; and
 - F. Monitor and rapidly implement control measures to ensure early detection and eradication of weed invasions.
16. Implement Erosion Control Measures. Standard erosion control measures shall be implemented for all phases of construction and operation. All disturbed soils and roads within the project site shall be stabilized to reduce erosion potential, both during and following construction. Areas of disturbed soils (access and staging areas) with slopes toward an ephemeral drainage or Harper Dry Lake shall be stabilized to reduce erosion potential.

17. Monitor Ground Disturbing Activities Prior to Site Mobilization. If ground disturbing activities are required prior to site mobilization, such as for geotechnical borings or hazardous waste evaluations, a Designated Biologist or Biological Monitor shall be present to monitor any actions that could disturb soil, vegetation, or wildlife. Actions not included in the project description are prohibited.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. Implementation of the measures will be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction termination report identifying how measures have been completed. Additional copies shall be provided to CDFG and USFWS.

Pre-Construction Nest Surveys and Impact Avoidance and Minimization Measures for Migratory Birds

BIO-8 Pre-construction nest surveys shall be conducted if construction activities will occur from February 1 through August 1. At all times of the year, noise generating activities shall be limited during early morning and evening to avoid impacts to birds protected under the Migratory Bird Treaty Act. The Designated Biologist or Biological Monitor shall perform surveys in accordance with the following guidelines:

1. Surveys shall cover all potential nesting habitat in the project site and within 500 feet of the boundaries of the plant site as well as any areas potentially exposed to noise levels above 60 dBA;
2. At least two pre-construction surveys shall be conducted, separated by a minimum 10-day interval. One of the surveys needs to be conducted within the 10-day period preceding initiation of construction activity. Additional follow-up surveys may be required if periods of construction inactivity exceed three weeks in any given area, an interval during which birds may establish a nesting territory and initiate egg laying and incubation;
3. If active nests are detected during the survey, a no-disturbance buffer zone (protected area surrounding the nest, the size of which is to be determined by the Designated Biologist in consultation with CDFG and USFWS) and monitoring plan shall be developed. Nest locations shall be mapped using GPS technology and submitted, along with a weekly report stating the survey results, to the CPM; and
4. The Designated Biologist or Biological Monitor shall monitor the nest until he or she determines that nestlings have fledged and dispersed; activities that might, in the opinion of the Designated

Biologist in consultation with the CPM, disturb nesting activities (e.g., excessive noise above 60 dBA), shall be prohibited within the buffer zone until such a determination is made.

Verification: At least 10 days prior to the start of any pre-construction site-mobilization, the project owner shall provide the CPM a letter-report describing the findings of the pre-construction nest surveys, including the time, date, and duration of the survey; identity and qualifications of the surveyor(s); and a list of species observed. If active nests are detected during the survey, the report shall include a map or aerial photo identifying the location of the nest and shall depict the boundaries of the no-disturbance buffer zone around the nest. Additional copies shall be provided to CDFG and USFWS.

Golden Eagle Territory-Specific Management Plan

BIO-9 In addition to the breeding season golden eagle inventory conducted in spring 2010 (per USFWS protocol [Pagel et al. 2010]), a non-breeding season golden eagle inventory survey shall be conducted in late-summer/early-winter 2010 (USFWS, in prep).

If an occupied golden eagle territory is identified within 10 miles of the project site (except for the territory identified at Black Mountain in April 2010) during breeding or non-breeding inventory surveys for the AMS project, the project owner shall prepare and implement a Golden Eagle Territory-Specific Management Plan. This plan shall:

1. Include measures to avoid and minimize disturbance (as defined in 50 CFR 22.3) to golden eagles during project construction and operation activities. Measures may include limited operating periods or no-disturbance buffers within which certain potentially disruptive project activities shall not be conducted, or modification of certain project activities to reduce the potential for disturbance to eagles.
2. Identify monitoring actions and schedule for their implementation to ensure avoidance and minimization of disturbance. Monitoring and reporting shall be conducted pre- and post-activity per Interim Golden Eagle Inventory and Monitoring Protocols (Pagel et al. 2010).

Verification: The project owner shall submit a report to the CPM, CDFG, and USFWS within 30 days of completion of breeding-season golden eagle surveys. This report shall document the results of the inventory and monitoring as described in Pagel et al. 2010.

The project owner shall submit a report to the CPM, CDFG, and USFWS within 30 days of completion of non-breeding season golden eagle surveys. This report shall document the results of the protocol surveys as described in Pagel et al. 2010 or more recent guidance by USFWS (e.g., Pagel et al, in prep).

At least 30 days prior to the start of any pre-construction site mobilization, the project owner shall provide the CPM, CDFG, and USFWS with the final version of the Golden Eagle Territory-Specific Management Plan, based on breeding-season inventory results. This final Plan shall have been reviewed and approved by the CPM in consultation with USFWS. If disturbance to eagles would not occur and a Plan is not warranted, a letter from USFWS documenting this determination shall be submitted to the CPM at least 10 days prior to the start of any pre-construction site mobilization.

An addendum to the Plan may be required by USFWS based on non-breeding season survey results. If required, a final addendum, which has been reviewed and approved by the CPM in consultation with USFWS, shall be submitted to the CPM within 90 days of completion of non-breeding season golden eagle surveys.

Documentation of Bald and Golden Eagle Act Compliance

BIO-10 The project owner shall provide documentation to the CPM that the project is in compliance with the Bald and Golden Eagle Protection Act (Title 16, United States Code, sections 668-668d).

Verification: No less than 10 days prior to the start of any pre-construction site mobilization, the project owner shall submit to the CPM documentation that the project is in compliance with the Bald and Golden Eagle Protection Act (Title 16, United States Code, sections 668-668d). This shall include documentation from the USFWS in the form of written or electronic transmittal indicating the status of the permit, if required, and any follow up actions required by the project owner. Any additional actions shall be added to the BRMIMP and implemented.

Desert Tortoise Exclusion Fencing, Clearance Surveys, and Translocation Plan

BIO-11 A Desert Tortoise Exclusion Fencing, Clearance Surveys, and Translocation Plan (Desert Tortoise Plan) shall be developed in consultation with the CPM, CDFG, and USFWS. This plan shall include detailed measures to avoid and minimize impacts to desert tortoise in and near the construction areas as well as methods for clearance surveys, fence installation, tortoise handling, artificial burrow construction, egg handling and other procedures, which shall be consistent with those described in the USFWS Desert Tortoise Field Manual (www.fws.gov/ventura/speciesinfo/protocols_guidelines) or more current guidance provided by CDFG and USFWS. At a minimum, the following measures shall be included in the plan and implemented by the project owner to manage their construction site, and related facilities, in a manner to avoid, minimize, or mitigate impacts to desert tortoise.

1. Fence Installation. Prior to ground disturbance, the entire project site shall be fenced with desert tortoise exclusion fence. To avoid impacts to desert tortoise during fence construction, the proposed fence alignment shall be flagged and the alignment surveyed within

24 hours prior to fence construction. Surveys shall be conducted by the Designated Biologist using techniques approved by the USFWS and CDFG. Biological Monitors may assist the Designated Biologist under his or her supervision. These surveys shall provide 100% coverage of all areas to be disturbed during fence construction and an additional transect along both sides of the proposed fence line. This fence line transect shall cover an area approximately 90 feet wide centered on the fence alignment. Transects shall be no greater than 30 feet apart. All desert tortoise burrows, and burrows constructed by other species that might be used by desert tortoises, shall be examined to assess occupancy of each burrow by desert tortoises and handled in accordance with USFWS-approved protocol.

- A. Timing and Supervision of Fence Installation. The exclusion fencing shall be installed prior to site clearing and grubbing. The fence installation shall be supervised by the Designated Biologist and monitored by the Biological Monitors to ensure the safety of any tortoise present.

- B. Fence Material and Installation. The permanent tortoise exclusionary fencing shall consist of galvanized hard wire cloth 1 by 2 inch mesh sunk 12 inches into the ground, and 24 inches above ground (refer to parameters for USFWS-approved tortoise exclusion fencing at www.fws.gov/ventura/speciesinfo/protocols_guidelines). For temporary exclusion fencing, a “folded bottom” technique shall be implemented. This method follows the same guidelines as installation of permanent fencing except instead of burying the bottom 12 inches of the fencing, it is bent at a approximately 90 degree angle (to follow the contour of the ground) and spikes or other retaining methods are driven into the ground every two linear feet in such a manner as to “anchor” the bottom of the fence. This method eliminates the need for trenching, which for short-term temporary impacts may be more beneficial to the recovery of the landscape, and thus the species.

- C. Security Gates. Security gates shall be designed with minimal ground clearance to deter ingress by tortoises. The gates shall remain closed except during vehicle passage and may be electronically activated to open and close immediately after vehicle(s) have entered or exited to prevent extended periods with open gates, which might lead to a tortoise entering.

- D. Stormwater Drainage Fencing. The onsite stormwater drainage channels, including the headwalls, outlet, and road crossings,

shall be permanently fenced to ensure exclusion of desert tortoise during AMS operation.

- E. Fence Inspections. Following installation of the desert tortoise exclusion fencing for the permanent site and stormwater drainage fencing and temporary fencing (if required), the fencing shall be regularly inspected. Permanent fencing shall be inspected monthly and during/immediately following all major rainfall events. Any damage to the fencing shall be temporarily repaired immediately to keep tortoises out of the site, and permanently repaired within two days of observing damage. Inspections of permanent site fencing shall occur for the life of the project. Temporary fencing must be inspected immediately following major rainfall events. All temporary fencing shall be repaired immediately upon discovery and, if the fence may have permitted tortoise entry while damaged, the Designated Biologist shall inspect the area enclosed by the fence for tortoise.
2. Desert Tortoise Clearance Surveys. Following construction of the tortoise exclusionary fencing around the Plant Site, all fenced areas shall be cleared of tortoises by the Designated Biologist, who may be assisted by Biological Monitors. A minimum of two, 100 percent coverage protocol clearance surveys with negative results must be completed and these must coincide with heightened desert tortoise activity from April through May and September through October. Non-protocol clearance surveys may be conducted in areas of certainly unsuitable habitat (e.g., developed) with prior approval of specific areas by USFWS and CDFG (these proposed areas shall be identified in the draft Desert Tortoise Plan). Clearance survey transects shall be followed as described in the Final Desert Tortoise plan. Additional clearance survey guidelines area provided in the USFWS *Desert Tortoise Field Manual* (www.fws.gov/ventura/speciesinfo/protocols_guidelines).

Translocation of Desert Tortoise. If desert tortoises are detected during clearance surveys within the project impact area, the Designated Biologist shall safely translocate the tortoise the shortest possible distance to the nearest suitable habitat. Any handling efforts shall be in accordance with techniques described in the final Desert Tortoise Plan, which shall be consistent with the USFWS *Desert Tortoise Field Manual* (www.fws.gov/ventura/speciesinfo/protocols_guidelines). If a visibly diseased tortoise is encountered onsite, procedures shall be implemented in accordance with the approved final Desert Tortoise Plan.

3. Burrow Inspection. All potential desert tortoise burrows within the fenced area shall be searched for presence. To prevent reentry by a tortoise or other wildlife, all burrows shall be collapsed once absence has been determined, in accordance with the final Desert Tortoise Plan. Immediately following excavation and if environmental conditions warrant immediate translocation, tortoises excavated from burrows shall be translocated to unoccupied natural or artificial burrows within the location approved by USFWS and CDFG per the final Desert Tortoise Plan.
4. Burrow Excavation. Burrows inhabited by tortoises shall be excavated by the Designated Biologist using hand tools, and then collapsed or blocked to prevent re-occupation, in accordance with the final Desert Tortoise Plan. If excavated during May through July, the Designated Biologist shall search for desert tortoise nests/eggs. All desert tortoise handling and removal, and burrow excavations, including nests, shall be conducted by the Designated Biologist in accordance with the USFWS *Desert Tortoise Field Manual* (www.fws.gov/ventura/speciesinfo/protocols_guidelines).
5. Monitoring During Clearing. Following the installation of exclusionary fencing and after ensuring desert tortoises are absent from the project site, heavy equipment shall be allowed to enter the project site to perform earth work such as clearing, grubbing, leveling, and trenching. A Biological Monitor shall be onsite at all times during initial clearing and grading activities. Should a tortoise be discovered, it shall be relocated as described above in accordance with the final Desert Tortoise Plan.
6. Reporting. The Designated Biologist shall record the following information for any desert tortoises handled: a) the locations (narrative and maps) and dates of observation; b) general condition and health, including injuries, state of healing and whether desert tortoise voided their bladders; c) location moved from and location moved to (using GPS technology); d) gender, carapace length, and diagnostic markings (i.e., identification numbers or marked lateral scutes); e) ambient temperature when handled and released; and f) digital photograph of each handled desert tortoise as described in the paragraph below. Desert tortoise moved from within project areas shall be marked for future identification as described in USFWS *Desert Tortoise Field Manual* (www.fws.gov/ventura/speciesinfo/protocols_guidelines). Digital photographs of the carapace, plastron, and fourth costal scute shall be taken. Scutes shall not be notched for identification.

Verification: At least 45 days prior to start of any pre-construction site mobilization, the project owner shall provide the CPM with the final version of the Desert Tortoise Translocation Plan that has been approved by Energy Commission staff, USFWS, and CDFG. The CPM will determine the plan's acceptability within 15 working days of receipt of the final plan. All modifications to the approved final Desert Tortoise Translocation Plan must be made only after approval by the Energy Commission staff, USFWS, and CDFG. The project owner shall notify the CPM no fewer than five working days before implementing any CPM-approved modifications to the Translocation Plan.

Within 30 days of completing of desert tortoise clearance surveys the Designated Biologist shall submit a report to the CPM, USFWS, and CDFG describing how each of the mitigation measures described above has been satisfied. The report shall include the desert tortoise survey results, capture and release locations of any translocated desert tortoises, and any other information needed to demonstrate compliance with the measures described above.

Mohave Ground Squirrel Clearance Surveys

BIO-12 The project owner shall implement the following measures to manage their construction site, and related facilities, in a manner to avoid or minimize impacts to Mohave ground squirrels (MGS):

1. Clearance Survey. After the installation of the desert tortoise exclusion fence and immediately prior to any ground disturbance, the Designated Biologist(s) shall examine the construction disturbance area for MGS and their burrows. The survey shall provide 100 percent coverage of suitable habitat within the project site (undisturbed desert saltbush scrub, disturbed desert saltbush scrub, disturbed desert saltbush scrub regrowth, fallow agriculture-saltbush scrub regrowth).
 - A. If potentially occupied burrows are identified, an attempt shall be made to trap and relocate the individual(s). Potentially occupied burrows shall be fully excavated by hand.
 - B. Trapping, relocation, and MGS burrow excavation shall only be conducted by individual(s) possessing an MOU with CDFG for such activities.
2. Records of Capture. If MGS are captured via trapping or burrow excavation, the Designated Biologist shall maintain a record of each Mohave ground squirrels handled, including: a) the locations (Global Positioning System [GPS] coordinates and maps) and time of capture and/or observation as well as release; b) sex; c) approximate age (adult/juvenile); d) weight; e) general condition and health, noting all visible conditions including gait and behavior, diarrhea, emaciation, salivation, hair loss, ectoparasites, and injuries; and f) ambient temperature when handled and released.

3. Relocation. Any MGS captured via trapping or burrow excavation shall be relocated to suitable habitat adjacent to the project site, which provides conditions suitable for the long-term survival of relocated MGS.

Verification: Within 30 days of completion of MGS clearance surveys, the Designated Biologist shall submit a report to the CPM and CDFG describing how the measures described above were implemented. The report shall include the MGS survey results, capture and release locations of any relocated squirrels, and any other information needed to demonstrate compliance with the measures described above.

Burrowing Owl Impact Avoidance, Minimization and Mitigation Measures

BIO-13 Prior to preconstruction surveys, a Burrowing Owl Monitoring and Mitigation Plan (Burrowing Owl Plan) shall be developed by the project owner in consultation with the CPM and CDFG. This plan shall include detailed measures to avoid and minimize impacts to burrowing owls in and near the construction areas (if identified during surveys) and shall be consistent with CDFG guidance (CDFG 1995). In addition, the plan shall identify the optimal time to concurrently relocate both desert tortoise and burrowing owl. At a minimum, the following measures shall be included in the plan and implemented by the project owner to manage their construction site, and related facilities, in a manner to avoid, minimize, or mitigate impacts to breeding and foraging burrowing owls.

1. Pre-Construction Surveys and Nest Avoidance. The Designated Biologist shall conduct pre-construction surveys for burrowing owls within the project site and a 160-foot buffer. These surveys shall be conducted concurrent with desert tortoise clearance surveys, to the maximum extent possible. The following shall be included in the Plan and implemented to avoid and minimize impacts to burrowing owls onsite:

Pre-construction surveys shall be conducted prior to the nesting season (February 1 through August 31) and all burrowing owls will be passively relocated using one-way trap doors. Once the Designated Biologist has verified that all burrowing owls have vacated an occupied burrow, the Designated Biologist shall collapse the burrow, preventing re-occupation.

- A. If ground disturbance cannot be avoided in areas where nesting burrowing owls are active, a 250-foot exclusion area around occupied burrows will be flagged and this area will not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are

foraging independently and are capable of independent survival. The exclusion area shall remain connected to natural area(s) to the extent possible, to avoid completely surrounding the owl with construction activities and/or equipment.

2. Artificial Burrow Installation. Prior to any ground-disturbing activities, the project owner shall install five artificial burrows for each identified burrowing owl burrow in the project area that would be destroyed, within in the approved compensatory habitat area. The Designated Biologist shall survey the site selected for artificial burrow construction to verify that such construction will not affect desert tortoise or Mohave ground squirrel or existing burrowing owl colonies in the relocation area. Installation of the artificial burrows shall occur after baseline surveys of the relocation area and prior to ground disturbance or heavy equipment staging. Design of the artificial burrows shall be consistent with CDFG guidelines (CDFG 1995) and shall be approved by the CPM in consultation with CDFG.
3. Passive Relocation. Prior to passive relocation, any owls that will be relocated shall be color banded with air-craft aluminum bands in accordance with the guidance provided by USGS bird banding lab (<http://www.pwrc.usgs.gov/bbl>) to monitor relocation success. Color banding shall not be conducted during the breeding season. During the non-breeding season, owls would be given a minimum of three weeks to become familiar with the new artificial burrows, after which eviction of owls within the project site could begin. Use of one-way doors described by Trulio (1995) and Clark and Plumpton (2005) would be used to facilitate passive relocation of owls.
 - A. Monitoring and Success Criteria. The Designated Biologist shall survey the compensatory mitigation area and a suitable habitat within a 600 meter radius from the project site to assess use of the artificial burrows by owls and relocation success after exclusion from the project area. Surveys shall be conducted using methods consistent with Phase II and Phase III California Burrowing Owl Consortium guidelines (CBOC 1993). Surveys shall be conducted two times in the spring and two times in the winter following eviction. The second survey within a season shall be conducted within 30 days of the first. Surveys shall continue for a period of two years to encompass a total of two spring seasons (4 total spring surveys) and two winter seasons (4 total winter surveys).

Surveys and monitoring shall be conducted using non-invasive methods (i.e., high-powered binoculars, spotting scope, or camera). Owls shall not be trapped or otherwise handled to read the color band.

If survey results indicate burrowing owls are not nesting within the surveyed area, remedial actions may be developed and implemented in consultation with the CPM, CDFG and USFWS to correct conditions at the site that might be preventing owls from nesting there. A report describing survey results and any remedial actions taken shall be submitted to the CPM, CDFG and USFWS no later than January 31 of each year for two years.

4. Preserve and Manage Compensatory Habitat. For each individual owl or pair identified on the project site during pre-construction surveys, off-site mitigation shall be required as described in the California Burrowing Owl Consortium guidelines (CBOC 1993). Determining which ratio to apply depends on whether the proposed compensatory habitat is occupied or unoccupied.
 - A. Replacement of occupied habitat with occupied habitat: 1.5 times 6.5 (9.75) acres per pair of single bird
 - B. Replacement of occupied habitat with suitable unoccupied habitat: 3 times 6.5 (19.5) acres per pair of single bird.

Compensatory habitat shall be suitable for occupation by burrowing owls and preserved and managed in perpetuity for this purpose. Compensatory mitigation may be within the 118.2 acres proposed for desert tortoise and MGS (refer to **BIO-15**), provided that it also meets the criteria for suitable burrowing owl habitat. The compensatory habitat shall be managed for the benefit of burrowing owls, with the specific goals of:

- A. Maintaining the functionality of artificial and natural burrows; and
- B. Minimizing the occurrence of weeds (species considered “moderate” or “high” threat to California wildlands as defined by CAL-IPC [2006] and noxious weeds rated “A” or “B” by the California Department of Food and Agriculture and any federal-rated pest plants [CDFG 2009]) at less than 10% cover of the shrub and herb layers.

The Burrowing Owl Plan shall also include monitoring and maintenance requirements for the compensatory habitat, details on methods for measuring compliance goals, and remedial actions to be taken if management goals are not met.

The final Burrowing Owl Plan is due before preconstruction surveys begin to ensure that an approved relocation methodology will be followed for any owls occurring within the project area. Therefore, it is understood that the compensatory mitigation acreage (if required) may not be identified in the Burrowing Owl Plan. However, the Plan shall propose a location for compensatory mitigation land and the acreage required, quantified according to the CBOC methods outlined above. If owls are identified during the pre-construction survey, the project owner shall submit an addendum to the Burrowing Owl Plan, which identifies the number of owls identified and the exact acreage to be preserved and managed in perpetuity for burrowing owl based on the results of the preconstruction survey and as agreed to in consultation with CDFG.

Verification: At least 45 days prior to start of any pre-construction site mobilization, the project owner shall provide the CPM and CDFG with the final version of the Burrowing Owl Monitoring and Mitigation Plan that has been reviewed and approved by the CPM in consultation with CDFG. An addendum to the plan, which includes the pre-construction survey results, (e.g., number of owls identified onsite) and the CDFG-approved amount of compensatory mitigation, shall be submitted within 10 days of completing the burrowing owl pre-construction surveys. The CPM will determine the acceptability of the Plan and addendum within 15 days of their receipt. All modifications to the approved Plan may be made by the CPM after consultation with CDFG. The project owner shall notify the CPM no less than five working days before implementing any CPM-approved modifications to the Burrowing Owl Monitoring and Mitigation Plan.

American Badger and Desert Kit Fox Impact Avoidance and Minimization Measures

BIO-14 To avoid direct impacts to American badgers and desert kit fox, preconstruction surveys shall be conducted for these species concurrent with the desert tortoise surveys. Surveys shall be conducted as described below:

Biological Monitors shall perform pre-construction surveys for badger setts and kit fox burrows in the project area, including areas within 250 feet of the project site. If burrows are detected, each burrow shall be classified as inactive, potentially active, or definitely active.

Inactive burrows and setts that would be directly impacted by construction activities shall be excavated by hand and backfilled to prevent reuse by badgers or kit fox.

Potentially and definitely active burrows and setts shall not be disturbed during the whelping/pupping season (February 1 – September 30). Potentially and definitely active dens that would be directly impacted by construction activities shall be monitored by the

Biological Monitor for three consecutive nights using a tracking medium (such as diatomaceous earth or fire clay) and/or infrared camera stations at the entrance. If no tracks are observed in the tracking medium or no photos of the target species are captured after three nights, the den shall be excavated and backfilled by hand. If tracks are observed, the Biological Monitor shall directly observe the burrow or sett and block the entrance after the animal exits and the Biological Monitor has verified that there are no animals in the burrow or sett. The burrow or den shall be blocked with natural materials (e.g., rocks, dirt, sticks, and vegetation piled in front of the entrance) or passive hazing methods shall be employed for the next three to five nights to discourage the badger or kit fox from continued use. Passive hazing methods shall be approved by CDFG. Live or other traps shall not be used (CCR Title 14 Section 460). A kit fox or badger shall never be trapped in its burrow/sett. After verification that the den is unoccupied it shall then be excavated and backfilled by hand to ensure that no badgers or kit fox are trapped in the den.

Verification: The project owner shall submit a report to the CPM and CDFG within 30 days of completion of badger and kit fox surveys. The report shall describe survey methods, results, measures implemented, and the results of the measures.

Compensatory Mitigation

BIO-15 To fully mitigate for habitat loss and incidental take of desert tortoise and Mohave ground squirrel as well as burrowing owl, the project owner shall acquire, prior to ground-disturbing activities, in fee or in easement, no less than 118.2 acres of land suitable for these species and shall provide funding for the enhancement and long-term management of these compensation lands. The responsibilities for management of the compensation lands may be delegated by written agreement to CDFG or to a third party, such as a non-governmental organization dedicated to habitat conservation, subject to approval by the CPM, in consultation with CDFG and USFWS prior to land acquisition or management activities. If habitat disturbance exceeds that described in this analysis, the project owner shall be responsible for acquisition and management of additional compensation lands and/or additional funds required to compensate for any additional habitat disturbances. Additional funds shall be based on the adjusted market value of compensation lands at the time of construction to acquire and manage habitat. Agreements to delegate land acquisition or management shall be implemented within 12 months of the Energy Commission's decision. The acquisition and management of compensation lands shall include, but is not limited to, the following elements:

1. Selection Criteria for Compensation Lands. The compensation lands selected for acquisition or title/easement transfer shall:
 - A. have substantial capacity to support resident and dispersing desert tortoise, MGS, and burrowing owl;
 - B. be a contiguous block of land (preferably) or located so that parcel(s) result in a contiguous block of protected habitat;
 - C. not be encumbered by easements or uses that would preclude fencing of the site or preclude management of the site for the primary benefit of the species for which mitigation lands were secured; and
 - D. include mineral/water rights or ensure that those rights may not be evoked in a manner to negate the value of the compensation lands.
2. Review and Approval of Compensation Lands Prior to Acquisition or Title/Easement Transfer. A minimum of three months prior to acquisition or transfer of the property title and/or easement, the project owner, or a third-party approved by the CPM, in consultation with CDFG and USFWS, shall submit a proposal to the CPM, CDFG, and USFWS describing the parcel(s) intended for purchase or title/easement transfer. This proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for desert tortoise, MGS, and burrowing owl in relation to the criteria listed above. Approval from the CPM, in consultation with USFWS and CDFG, shall be required for acquisition of all parcels comprising no less than 118.2 acres in advance of purchase or title/easement transfer.
3. Review and Approval of Compensation Lands Management Plan. Within six months of the land or easement purchase or transfer, as determined by the date on the title, the project owner, or a third-party approved by the CPM, in consultation with CDFG and USFWS, shall submit a compensation lands management plan to the CPM, CDFG, and USFWS. The plan shall include, but not be limited to proposed measures to enhance habitat (e.g., removal of structures and other human attractants); maintenance procedures; general maintenance provisions (e.g., trash dumping, trespass, pesticide use avoidance, etc.).
4. Mitigation Security for Compensation Lands and Avoidance/Minimization Measures. The project owner shall provide financial assurances to the CPM, with copies of the document(s) to CDFG and USFWS, to guarantee that an adequate level of funding is available to implement all biological avoidance, minimization, and

compensation measures described in the conditions of certification. These funds shall be used solely for implementation of the measures associated with the project.

The project owner or an approved third party shall complete acquisition of the proposed compensation lands prior to initiating ground-disturbing project activities.

5. Conditions for Acquisition of Compensation Lands. The project owner shall comply with the following conditions relating to acquisition of compensation lands or transfer of the property's title and/or easement after the CPM, in consultation with CDFG and USFWS, has approved the proposed compensation lands as described above.
 - A. Preliminary Report: The project owner, or approved third party, shall provide a recent preliminary title report (no more than six months old), hazardous materials survey report (i.e., Phase I ESA), biological analysis, and other necessary documents for the proposed 118.2 acres. All documents conveying or conserving compensation lands and all conditions of title/easement are subject to a field review and approval by the CPM, in consultation with CDFG and USFWS, California Department of General Services and, if applicable, the Fish and Game Commission and/or Wildlife Conservation Board.
 - B. Title/Conveyance: The project owner shall transfer fee title/deed or a conservation easement for the 118.2 acres of 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 and USFWS; in the event an approved non-profit holds a conservation easement over the compensation lands, CDFG shall be named a third party beneficiary. USFWS shall be named a third party beneficiary regardless of who holds the easement. The project owner shall also provide a property assessment and warranty.
 - C. Enhancement Fund. The project owner shall fund the initial protection and enhancement of the 118.2 acres by providing the enhancement fund to the CDFG. Alternatively, a CPM-approved, in consultation with CDFG and USFWS, non-profit organization qualified pursuant to California Government Code section 65965 to manage the compensation lands may hold the

enhancement funds. If CDFG takes fee title to the compensation lands, the enhancement fund must go to CDFG.

- D. Endowment Fund: Prior to ground-disturbing project activities, the project owner shall provide to CDFG a capital endowment in the amount determined through the Property Analysis Record (PAR) or PAR-like analysis that will be conducted for the 118.2 acres of compensation lands. Alternatively, a CPM-approved, in consultation with CDFG and USFWS, non-profit organization qualified pursuant to California Government Code section 65965 may hold the endowment fees. If CDFG takes fee title to the compensation lands, the endowment must go to CDFG, where it will likely be held in the special deposit fund established pursuant to Government Code section 16370. If the special deposit fund is not used to manage the endowment, the California Wildlife Foundation will manage the endowment for CDFG and with CDFG guidance.

The project owner and the CPM shall ensure that an agreement is in place with the endowment holder/manager to ensure the following:

- Interest. Interest generated from the initial capital endowment shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action designed to protect or improve the habitat values of the compensation lands.
- Withdrawal of Principal. The endowment principal shall not be drawn upon unless such withdrawal is deemed necessary by the CDFG or the approved third-party endowment manager to ensure the continued viability of the species on the 118.2 acres. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision will likely be deposited in a special deposit fund established pursuant to Government Code section 16370. If the special deposit fund is not used to manage the endowment, the California Wildlife Foundation will manage the endowment for CDFG and with CDFG guidance.
- Pooling Endowment Funds. CDFG, or a CPM-approved, in consultation with CDFG and USFWS, non-profit organization qualified pursuant to California Government Code section 65965 to hold endowments may pool the endowment with other endowments for the operation, management, and

protection of the 118.2 acres for local populations of desert tortoise and MGS. However, for reporting purposes, the endowment fund must be tracked and reported individually.

- E. Security Deposit. The project owner may proceed with ground disturbing activities before fully performing its compensatory mitigation duties and obligations as set forth above only if the project owner secures its performance by providing funding to CDFG (Security Deposit), or if CDFG approves, administrative proof of funding, necessary to cover easement costs, fencing/cleanup costs, and as necessary, initial protection and enhancement of the compensation lands. If the Security is provided to allow the commencement of project disturbance prior to completion of compensation actions, the project owner, CDFG, or a third-party entity approved by the CPM, in consultation with CDFG and USFWS, may draw on the principle sum if it is determined that the project owner has failed to comply with the conditions of certification. The security will be returned to the project owner upon completion of the legal transfer of the compensation lands to CDFG or approved third-party entity, or upon completion of an implementation agreement with a third party mitigation banking entity acceptable to the CPM and CDFG, to acquire and/or manage the compensation lands.

The Security is calculated as follows:

- Costs of enhancing compensation lands are estimated at \$250 per acre.
- Costs of establishing an endowment for long-term management of compensation lands are estimated at \$1,300 per acre.

- F. Reimbursement Fund. The project owner shall provide reimbursement to the CDFG or approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other state agency reviews; and overhead related to providing compensation lands.

The project owner is responsible for all compensation lands acquisition/easement costs, including but not limited to, title and document review costs, as well as expenses incurred from other state agency reviews and overhead related to providing compensation lands to the department or approved third party; escrow fees or costs; environmental contaminants clearance; and other site cleanup measures.

The project owner may choose to satisfy its mitigation obligations by paying an in-lieu fee instead of acquiring compensation lands to mitigate for 118.2 acres of habitat, pursuant to California Senate Bill 34 (enacting CESA § 2069 and 2099) or other applicable in-lieu fee provision, to the extent the in-lieu fee provision is found by the Energy Commission to be in compliance with CEQA and CESA requirements.

Verification: No less than 90 days prior to acquisition of the property, the project owner, or a third-party approved by the CPM, in consultation with CDFG and USFWS, shall submit a formal acquisition proposal to the CPM, CDFG, and USFWS describing the parcel(s) intended for purchase or title/easement transfer. At least 30 days prior to construction-related ground disturbance (or as allowed under 5(e), above), the project owner shall provide written verification to the CPM that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient(s). Within six months of the land or easement purchase, as determined by the date on the title, the project owner shall provide the CPM with a management plan for review and approval, in consultation with CDFG, for the compensation lands and associated funds.

Within 90 days after completion of project construction, the project owner shall provide to the CPM verification that disturbance to desert tortoise and MGS habitat did not exceed 430 acres, and that construction activities did not result in impacts to desert tortoise, MGS, and burrowing owl habitat adjacent to work areas. If habitat disturbance exceeds that described in this analysis, the CPM shall notify the project owner of any additional funds required or lands that must be purchased to compensate for any additional habitat disturbances at the adjusted market value at the time of construction to acquire and manage habitat.

If electing to use an in-lieu fee provision, the project owner shall request from the Energy Commission a determination that the project's in-lieu fee proposal meets CEQA and CESA requirements.

Tamarisk Eradication, Monitoring, and Reporting Program

BIO-16 The project owner shall ensure effective removal of tamarisk by designing and implementing a monitoring and reporting plan. The plan shall include proposed methods for tamarisk removal and treatment, monitoring and maintenance procedures/timeline, irrigation, success standards and contingency measures, and monitoring and maintenance objectives to prevent the re-invasion of undesirable weeds and/or invasive wildlife species for a minimum of five years. The plan shall include identification on a map of each location and size of non-native vegetation to be removed, and the methods proposed to remove and dispose of invasive wildlife species. Exotic, non-native, and invasive species removal shall be conducted throughout the monitoring and maintenance period. Prior to any tree removal, it will be verified that there are no nesting raptors or other MBTA-protected birds.

For the CPM and CDFG to deem eradication successful:

- The site shall not contain more than 5% exotic plant species for the CPM and CDFG to deem the tamarisk removal successful.
- All plant species with rates of dispersal and establishment listed as “High” or “Moderate” on the California Invasive Plant Inventory shall have documented absence, or have been removed from the site for at least three years for the CPM and CDFG to deem the site successful.
- The site shall not contain invasive wildlife species for the CPM and CDFG to deem the site successful.

Monitoring and maintenance of the site shall be conducted for five years unless less monitoring can be justified. Following the first year of monitoring, if the project owner petitions to terminate the monitoring program, staff and CDFG will determine whether more years are of monitoring are needed.

Verification: At least 30 days prior to any construction-related ground disturbance, the project owner shall submit to the CPM a copy of the Energy Commission staff- and CDFG-approved Tamarisk Eradication Monitoring and Reporting Plan, including success criteria.

The Designated Biologist shall submit annual reports to the CPM and CDFG describing the dates, durations and results of monitoring. The reports shall fully describe the status of the tamarisk at the eradication site, and shall describe any actions taken to remedy regrowth.

The CPM and CDFG shall 1) verify compliance with protective measures to ensure the accuracy of the project owner's mitigation, monitoring and reporting efforts; and 2) review relevant documents maintained by the project owner, interview the project owner's employees and agents, inspect the work site, and take other actions as necessary to assess compliance with or effectiveness of protective measures.

Monitoring Impacts of Solar Collection Technology on Birds

BIO-17 The project owner shall prepare and implement a Bird Monitoring Study to monitor the death and injury of birds from collisions with facility features such as reflective mirror-like surfaces and from heat, and bright light from concentrating sunlight. The study design shall be approved by the CPM in consultation with CDFG and USFWS, and shall be incorporated into the project's BRMIMP and implemented. The Bird Monitoring Study shall include detailed specifications on data and carcass collection protocol and a rationale justifying the proposed schedule of carcass searches. The study shall also include seasonal trials to assess bias from carcass removal by scavengers as well as searcher bias.

Verification: At least 60 days prior to any construction-related ground disturbance, the project owner shall submit to the CPM, USFWS, and CDFG a draft Bird Monitoring Study. The CPM shall review and provide written comments within 15 days of receipt of the Bird Monitoring Study. At least 30 days prior to start of any construction-related ground disturbance activities, the project owner shall provide the CPM with the final version of the Bird Monitoring Plan that has been reviewed and approved by the CPM, in consultation with CDFG and USFWS. All modifications to the Bird Monitoring Study shall be made only after approval from the CPM.

For at least two years following the beginning of operation the Designated Biologist shall submit quarterly reports to the CPM, CDFG, and USFWS describing the dates, durations and results of monitoring. The quarterly reports shall provide a detailed description of any Project-related bird or wildlife deaths or injuries detected during the monitoring study or at any other time.

Following the completion of the fourth quarter of monitoring the Designated Biologist shall prepare an Annual Report that summarizes the year's data, analyzes any Project-related bird fatalities or injuries detected, and provides recommendations for future monitoring and any adaptive management actions needed. The Annual Report shall be provided to the CPM, CDFG, and USFWS.

Quarterly reporting shall continue until the CPM, in consultation with CDFG and USFWS, determine whether more years of monitoring are needed, and whether mitigation (e.g., development and/or implementation of bird deterrent technology) and/or adaptive management measures are necessary. After the Bird Monitoring Study is determined by the CPM to be complete, the project owner or contractor shall prepare a paper that describes the study design and monitoring results to be submitted to a peer-reviewed scientific journal. Proof of submittal shall be provided to the CPM within one year of concluding the monitoring study.

Common Raven Monitoring, Management, and Control

BIO-18 The project owner shall implement the following measures to manage their construction site and related facilities in a manner to control raven populations and to mitigate cumulative and indirect impacts to desert tortoise associated with regional increases in raven numbers:

1. Common Raven Monitoring, Management, and Control Plan. The project owner shall design and implement a Common Raven Monitoring, Management, and Control Plan that is consistent with the most current USFWS-approved raven management guidelines and that meets the approval of USFWS, CDFG, and Energy Commission staff. The Raven Plan shall:

- A. Identify conditions associated with the project that might provide raven subsidies or attractants;
 - B. Describe management practices to avoid or minimize conditions that might increase raven numbers and predatory activities;
 - C. Describe control practices for ravens;
 - D. Address monitoring and nest removal during construction and for the life of the project;
 - E. And discuss reporting requirements.
2. USFWS Regional Raven Management. The project owner shall submit payment to the project sub-account of the REAT Account held by the National Fish and Wildlife Foundation (NFWF) to support the regional raven management plan. The amount shall be a one-time payment of \$105 per acre of land permanently disturbed by the project.

Verification: At least 30 days prior to start of any construction-related ground disturbance activities, the project owner shall provide the CPM, USFWS, and CDFG with the final version of the Raven Management Plan that has been reviewed and approved by USFWS and CDFG. The CPM shall determine the plan's acceptability within 10 days of receipt of the final plan. All modifications to the approved Raven Management Plan must be made only after consultation with the Energy Commission staff, USFWS, and CDFG. The project owner shall notify the CPM no less than five working days before implementing any CPM-approved modifications to the Raven Plan.

Prior to start of any construction-related ground disturbance activities, the project owner shall submit to the CPM verification of payment to the REAT Account to support the regional raven monitoring plan. Payment shall be included in the AMS project's land management enhancement fund, pursuant to Condition of Certification **BIO-15 (5(D))**.

Within 30 days after completion of project construction, the project owner shall provide to the CPM for review and approval a report identifying which items of the Raven Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which items are still outstanding.

Evaporation Pond Monitoring and Adaptive Management Plan

BIO-19 The project owner shall design and implement an Evaporation Pond Monitoring and Adaptive Management Plan that meets the requirements of the USFWS, CDFG, RWQCB and the CPM. The objective of the Plan is to define the monitoring and reporting procedures as well as triggers for adaptive management strategies that shall be implemented to prevent wildlife mortality at the evaporation ponds. The plan shall include:

- A description of evaporation pond design features such as side slope specifications, freeboard and depth requirements, which will prevent use by wildlife;
- A detailed description of the wildlife monitoring procedures and schedule. For the initial implementation of a new technology, daily monitoring shall be conducted both at the project evaporation ponds and the wetlands within the Harper Lake ACEC. Monitoring may be reduced to weekly and potentially bi-weekly or monthly depending on the results of initial monitoring period.
- A detailed description of the water quality and water level monitoring procedures and schedule. Water quality and water level monitoring shall coincide with wildlife monitoring to provide a basis for comparative analysis.
- A description of wildlife exclusion/deterrent technologies and adaptive management strategies. Technologies shall include, but are not limited to netting, and shall not disturb or harass non-target wildlife adjacent to the project area.
- Triggers for adaptive management (i.e., modifications to existing technology or replacement with new technology). Adaptive management shall be necessary if: 1) more than one dead bird per quarter is discovered at the evaporation ponds; or 2) one special-status animal is discovered at the evaporation ponds; or 3) noise levels attributable to the technology exceed 60dB at the Harper Lake ACEC wetlands. After three failed attempts at new technology or modification of existing technology, the ponds shall be netted;
- Reporting requirements, to include monthly reporting for the first year if a technology other than netting is used. Reporting may be reduced to monthly or quarterly thereafter if no bird or wildlife deaths are reported during the first year. If wildlife mortality occurs at the ponds or if birds are disturbed at the marsh as described above, the CPM shall be notified within 10 days of the incident and the accompanying adaptive management action to be implemented.

Evaporation pond monitoring and reporting shall continue for the life of the project. The draft Plan submitted by the Applicant (AS 2009d) shall provide the basis for the final plan, subject to review and revisions from the CPM in coordination with USFWS, CDFG, and RWQCB.

Verification: At least 30 days prior to operation of the evaporation ponds, the project owner shall provide the CPM, USFWS, RWQCB, and CDFG with the final version of the Plan that has been reviewed and approved by the CPM in consultation with USFWS, RWQCB, and CDFG. The project owner shall first submit a draft plan to the CPM that incorporates the guidance in this condition. The CPM, in coordination with USFWS, RWQCB, and CDFG, shall provide written comments to the project owner within 30 days of receipt of the draft plan and shall determine the acceptability of the final plan within 15 days of its receipt. All modifications to the approved Plan may be made by the CPM after consultation with USFWS, RWQCB, and CDFG. The project owner shall notify the CPM no less than five working days before implementing any CPM-approved modifications to the Evaporation Pond Plan.

Harper Dry Lake Marsh Water Delivery

BIO-20 To ensure continuity of water delivery to the Harper Dry Lake ACEC the project owner shall not decommission the existing well on Mojave Solar, LLC-owned property that currently serves the Harper Dry Lake marsh (wetland well) until an alternate well is able to effectively convey a minimum of 75 acre feet per year to the Harper Dry Lake marsh.

This condition of certification does not transfer to Mojave Solar, LLC the obligation of Luz Solar Partners Ltd. to allow BLM to pump 75 acre feet of water per year to the marsh, under SEGS IX Condition of Certification **BIO-11.k**.

Verification: At least 15 days prior to decommissioning the wetland well, the project owner shall provide proof, to the satisfaction of the CPM, that the alternate well is completed and able to effectively convey a minimum of 75 acre feet per year to the Harper Dry Lake marsh. Proof shall include, but not be limited to, a description of the well parameters, as constructed.

USFWS Biological Opinion

BIO-21 The project owner shall provide a copy of the Biological Opinion per Section 7 of the federal Endangered Species Act written by the U. S. Fish and Wildlife Service in consultation with U.S. Department of Energy. The terms and conditions contained in the Biological Opinion shall be incorporated into the project's BRMIMP and implemented by the project owner.

Verification: For the Biological Opinion to effectively provide guidance on pre-construction actions for listed species (e.g., desert tortoise clearance surveys and translocation), the project owner shall submit to the CPM a copy of the USFWS's Biological Opinion at least 45 days prior to the start of any pre-construction site mobilization. At this time the project owner shall also verify that the permit terms and conditions of the Biological Opinion are incorporated into the BRMIMP and will be implemented.

APPENDIX B

**DESIGNATED BIOLOGIST RESUME
AND REFERENCES**

Peggy Wood

Wildlife Biologist

1133 North Cedarview Dr.
Bozeman, MT 59715
Cell: (435) 881-6444
Email: pegwood@mtwest.net

EDUCATION

- MS Wildlife Ecology, 1986. Utah State University, Logan, UT.
Thesis: Interceptive Feeding as a Means of Reducing Deer-vehicle Collisions.
- BS Wildlife Science, 1984 - With Honors. Rutgers University, NJ.

RESEARCH SKILLS

Population sampling: species presence surveys; area coverage techniques for animal and bird species, population size estimation using various transect methods; plant frequency and density transect methods; fish sampling and tagging methods. Scientific writing. Telemetry tracking techniques; behavioral information collection; methodical and concise data organization, tabulation, and analysis. Critical thinking.

EXPERIENCE

Biological Consultant

Peggy Wood, Inc. - An independently owned company. Bozeman, MT (1/90-present).

Research with the Wildlife Conservation Society (WCS) in 2003 on wolverines in the NW region of the Greater Yellowstone Ecosystem, Madison valley, MT. Ran traps and worked with veterinarian on captured wolverine. Lynx research for WCS (1998-2001) in MT, WA and NY involving non-invasive snagging of lynx hair for DNA analysis to identify species and individual identity. Conducted density sampling transects for snowshoe hares, the lynx prey base, in MT and ID. Adapted this hair snagging technique for detection of ocelots in south TX in 1999 and 2000.

Conducted goshawk surveys in the Black Hills of South Dakota (spring '05, '08); involved broadcasting calls and tracking adults to the nest.

Work with desert tortoises since 1990 including federal permits for handling and CA Scientific Collecting Permit. Research projects include population estimation by mark-recapture method, line distance density estimation using transects across the Mojave (spring, summer 2001), and line-intercept method (Fort Irwin, 1999). Supervised crew of 12 on 3 NV tortoise population study plots (spring 1994); field researcher on 7 AZ tortoise population study plots (fall '91, '92, '93) & 2 CA plots (spring '91). Data included location, weight, measurements, health, and photographs; assisted writing final reports. Other tortoise projects include resource assessment surveys in CA, NV and UT on over 30 projects including 5 solar energy projects (2008-2010), 6 sq. mi. proposed wind farm ('05), 7 sq.mi. Hyundai Motor vehicle test track ('04), pipelines, fiberoptic lines, transmission lines, railroad landfill, highway expansions, community developments, and commercial development. Worked as a biological monitor on construction sites to insure compliance with federal resource protection mandates on over 50 construction projects including Union Pacific RR repair and maintenance ('06, '07), pipelines, transmission and fiberoptic lines, highway improvements and expansions. Responsibilities included providing environmental education to workers, insuring contractor compliance with federal guidelines, conducting surveys and interpreting activities and impacts to the resource, radio-tracking desert tortoises on and surrounding work sites, and recording and reporting all work related activities, observations, and problems as required per project.

- Biological Consultant (cont.)** Completed southwestern willow flycatcher protocol training, St. George, UT. Participated with expert birders on swwf riparian surveys for experience. Monitored construction of AT&T fiberoptic line in Klamath National Forest, CA, for compliance with northwest environmental protection mandates. GIS and Remote Sensing basic training; ARC/INFO digitizing for GeoGraphics, Inc. Species surveys include: raptor nest, bat, and vegetation surveys near Delta, UT; bird, small mammal and fish inventory surveys along riparian habitat of the Virgin River near Mesquite, NV; Forest Service inventory plots in Boise National Forest, ID, for description of tree species and habitat characteristics; relative abundance bird survey transects on cottonwood plantations in eastern WA to identify and compare bird use there with surrounding avifauna; spotted owl surveys following BLM protocol in Klamath National Forest, CA; sage grouse lek surveys in northern CA; and bald eagle wintering habitat surveys in northern UT. Evaluated the legality of an innovative zoning amendment in CO to limit development at high elevation; researched characteristics of high elevation lands. Completed FWS-certified prairie dog colony mapping and black-footed ferret clearance surveys for WYCAL Gas Pipeline in SW Wyoming and for CIG Gas Pipeline in WY, CO and UT; involved extensive nocturnal spotlighting surveys. Telemetry tracked humpback chub on 3 river trips within Grand Canyon National Park; involved motor rafting up and down the Colorado River; set drift nets and fish traps to document native fish populations. On the Yampa River in CO, radio-tracked, electroshocked and pit tagged native fish species; included field surgery operations to implant radio transmitters. Radio tracked chub on Green River, UT; electrofished and netted through Cataract Canyon
- Wildlife Field Biologist** Dr. John Weaver, University of Montana; work in Jasper National Park, Alberta, Canada (6/89-9/89). Conducted big game pellet group transects throughout the home range of a wolf pack as part of a timber wolf prey selectivity study in Jasper National Park, Alberta, Canada. Coordinated field logistics; supervised one field assistant.
- Wildlife Consultant** Bio/West, Inc., Logan, UT (1/88-1/89). Evaluated the potential impacts of various types of development on wildlife including: FWS-certified prairie dog colony mapping and black-footed ferret searches in WY, CO, and UT; a study of avian behavioral response to and collision rate with a 260 kV transmission line in northwest MT; ski area expansion effects on black bears in VT; and endangered fish species electroshocking, netting and radio tracking studies in the Colorado and Green Rivers. Authored portions of project reports.
- Biological Technician** US Fish & Wildlife Service, Alaska Maritime National Wildlife Refuge: Aleutian Islands Unit, Adak, AK (1/87-4/87). Completed secondary phase of arctic fox eradication on Kiska Island implemented for the preservation of the endangered Aleutian Canada goose. Conducted bald eagle and sea lion helicopter surveys on Kiska Island; repeatedly surveyed Adak Island avifauna; collected bald eagle morphometrics on electrocuted birds; analyzed auklet activity patterns using time-lapse photography.

Peggy Wood (cont.)

- Graduate Research Assistant** Utah State Univ., Logan, UT (10/84-12/86). Master's research: documented deer-vehicle collision frequency and distribution on three Utah highway segments; provided interceptive attractant to modify deer movement patterns and reduce collision frequency. Taught Natural Resources 101 two quarters on issues relating to natural resource conservation.
- Range Research Technician** Utah Div. of Wildlife Resources, Salt Lake City, UT (5/85 -10/85). Sampled vegetation frequency and density to evaluate condition of big game wintering range in south-central UT.
- Research Assistant** Alaska Dept. of Game and Fisheries, Anchorage, AK (7/84-8/84). Conducted vegetation transects to estimate moose browse biomass in the Susitna River Valley, central AK, preliminary to proposed hydroelectric dam site; used Landsat photographs to locate and access sampling transects by helicopter; utilized Epson mini-computers in the field.
- Bald Eagle Hack Site Attendant** NJ Div. of Fish, Game & Wildlife, Port Norris, NJ (6/83-9/83). Raised six bald eagle young in a hack tower; telemetry tracked the fledglings following their release using a vehicle, boat and small plane; conducted a study of bald eagle pre-fledging behavior in a hack tower.
- Nature Education Counselor** Wharton State Forest, NJ (8/83). Instructed children aged 8 to 16 on basic ecological concepts in the Pine Barrens of NJ.

PUBLICATIONS

- Weaver, J.L., P. Wood, D. Paetkau, and L.L. Laack. 2005. Use of scented hair snares to detect ocelots. *Wildl. Soc. Bull.* Vol 33(4):1384-1391.
- Weaver, J.L., C. Arvidson, and P. Wood. 1992. Two wolves, *Canis lupus*, killed by a moose, *Alces alces*, in Jasper National Park, Alberta. *Canadian Field Naturalist.* 106(1):126-127.
- Wood, P. and M.L. Wolfe. 1988. Interceptive feeding as a means of reducing deer-vehicle collisions. *Wildl. Soc. Bull.* Vol 16(4):376-380.

PERSONAL INFORMATION

Birth date: 28 September 1962 Health: Excellent
Interests: telemark skiing, running, backpacking, kayaking, rock climbing, reading, music, and travel.

REFERENCES

John Weaver, PhD: Wildl. Cons. Society, St. Ignatius, MT 59865 406/745-0169
jlweaver@blackfoot.net

Alice Karl, PhD, Terrestrial Ecologist, Davis, CA 530/304-4121
heliophile@mindspring.com

Christina Vojta, PhD: US Fish & Wildlife Service, Flagstaff, AZ 928/814-6132
cvojta@fs.fed.us

Craig Knowles, PhD, Research Biologist, Townsend, MT 406/439-0191
faunaWest@aol.com

DESERT TORTOISE AUTHORIZED BIOLOGIST REQUEST FORM

This form should be used to provide your qualifications to agency officials if you wish to undertake the duties of an authorized biologist with regard to desert tortoises during construction or other projects authorized under Sections 7 (Biological Opinions) or 10(a)(1)(B) (i.e., Habitat Conservation Plans) of the Endangered Species Act.

(If you seek approval to attach/remove/insert any devices or equipment to/into desert tortoises, withdraw blood, or conduct other procedures on desert tortoises, a recovery permit or similar authorization may be required. Application for a recovery permit requires completion of Form 3-200-55, which can be downloaded at <http://www.fws.gov/forms/3-200-55.pdf>.)

1. Contact Information:

Name	Peggy Wood
Address	1133 North Cedarview Drive
City, State, Zip Code	Bozeman, Montana, 59715
Phone Number(s)	(435) 881-6444 (Cell) or (406) 582-7886 (Home)
Email Address	pegwood@mtwest.net

2. Date: **December 20, 2010**

3. Areas in which authorization is requested (check all that apply):

- San Bernardino, Kern, Inyo and Los Angeles Counties, California (Ventura office)
- Riverside, San Diego, and Imperial Counties, California (Carlsbad office)
- Nevada Utah Arizona

4. Please provide information on the project:

USFWS Biological Opinion or HCP No. When Applicable		Date:	
Project Name	Abengoa Solar		
Federal Agency	USFWS		
Proponent or Contractor	Abengoa Solar, Inc		

5. If you hold, or have held, any relevant state or federal wildlife permits provide the following:

Species	Dates	State (specify) or Federal Permit Number	Authorized Activities
Scientific Collecting Permit - reptiles	June 20, 2008 to June 20, 2010	SC-9851	Take, possess, capture, release, and salvage reptiles including desert tortoises.

6. Education: Provide up to three schools, listing most recent first:

Institution	Dates attended	Major/Minor	Degree received
Utah State University	Fall 1984 – Winter 1986	Wildlife Ecology	Master of Science
Rutgers University	Fall 1980 – Summer 1984	Wildlife Science	Bachelor of Science

7. Desert Tortoise Training:

Name/Type of Training	Dates (From/To)	Location	Instructor/Sponsor
1. Classes Tortoise Handling Workshop	October, 1990	Ridgecrest, CA	Desert Tortoise Council
2. Field Training Tortoise Handling Workshop	October, 1990	Ridgecrest, CA	Desert Tortoise Council
3. Translocation None			
4.			

8. Experience – Include only those positions relevant to the requested work with desert tortoises. Distinguish between wild Mojave desert tortoise and other experience. Include only your experience, not information for the project you worked on (e.g., if 100 tortoises were handled on a project and you handled 5 of those tortoises, include only those 5. List most recent experience first. Handling a Mojave desert tortoise must be authorized by a Biological Opinion or other permit and reported to the USFWS. Information provided in this section will be used by the USFWS to track the numbers of tortoises affected by previous projects (baseline). **Be sure to include a project supervisor or other contact that can verify your skills and experience in relation to your job performance.** Attach additional sheets as necessary.

Experience by project and activity:

Project Name, Job Title, Dates	Project Contact name, phone no., & Email address	Conduct Clearance Surveys (Hrs/Days)	Excavate DT burrows (No.)	Locate DT No. < 100mm ≥ 100mm	Handled for Relocation DTs (No.)	Excavate, and relocate DT nests (No.)
1. North-South Interconnect, Biological Monitor, BO No. 8-8-09-F-66; July-November 2010	Armen Keocheckian, Insignia Environmental, (760)635-1687, akeocheckian@insigniaenv.com	170Hrs/17 Days Sign Count Surveys	0	0 / 6	0	0
2. MCAGCC Triangle Transects, Survey Biologist; October-November 2009	Alice Karl, (530) 304-4121, heliophile@minspring.com	340Hrs/35 Days Sign Count Surveys	0	2 / 27	0	0
3. AT&T Fiberoptic Cable Replacement, BO No. 1-8-08-F-12; Authorized Tortoise Monitor; May-Jul 2009	Mike McEntee (Chambers Group) (949) 261-5414, mmcented@chambersgroupinc.com	280Hrs/32 Days Preconstruction surveys	0	0 / 1	0	0
4. Harper Lake Mojave Solar; Lead Survey Biologist; April-May, 2007; April-June, 2008; May, 2009	Lyndon Quon (EDAW), (619) 764-6800, lyndon.quon@edaw.com	570Hrs/ 57 Days presence/absence survey	0	5 / 31	0	0
5. Beacon Solar Energy; Lead Survey Biologist, March-April, 2007 and April, 2008	Lyndon Quon (EDAW) (619) 764-6800, lyndon.quon@edaw.com	240Hrs/ 25 Days presence/absence survey	0	0 / 6	0	0
6. 29 Palms Pressure Betterment, BO No. 1-5-00-F-420, Biological Monitor, March-April, 2008	Mark Cassady (TRC), (805) 528-7099, mcassady@trcsolutions.com	180Hrs/ 17 Days preconstruction surveys	0	0 / 9	0	0
7. Union Pacific RR Restoration, BO No. 1-5-06-F-423, Lead Authorized Monitor, November, 2005 to January, 2007	Lyndon Quon, (EDAW), (619) 764-6800, lyndon.quon@edaw.com	2060Hrs/ 160Days preconstruction surveys	0	0 / 6	2	0
8. Mesquite Landfill Survey; Survey Biologist, October 2005	Alice Karl, (530) 304-4121, heliophile@minspring.com	260Hrs/ 26 Days presence/absence survey	0	0 / 2	0	0

9. Hyundai Vehicle Test Track, BO No. 1-8-98-F-60R, Authorized Tortoise Radio Tracker, Surveyor, and Monitor, January-October, 2004	Mercy Vaughn, 928-380-5507, manydogs10@aol.com	1910Hrs/ 210 Days preconstruction survey	2	0	11	1
10. Moapa Transmission Line (cannot find BO No.) Lead Biological Monitor, July-November, 2002	Connie Farmer, 303-918-2501, constance.farmer@tteci.com	1260Hrs/ 115 Days presence/absence survey	0	0	1	0
11. Line Distance Surveys; Survey Biologist; Apr-Jun 2001	Pete Woodman, (760) 377-3466, kivabio@aol.com	470Hrs/45 Days	0	2	0	0
12. Littlefield Popn Study Plot (cannot find BO No.), Lead Survey Biologist, March-May, 1998	Pete Woodman, (760) 377-3466, kivabio@aol.com	360Hrs/ 45 Days research, survey, handling	0	12	29	0
13. Chemehuevi Valley Popn Study Plot (cannot find BO No.), Survey Biologist, April-May, 1992	Pete Woodman, (760) 377-3466, kivabio@aol.com	160Hrs/ 18Days research, survey, handling	0	5	37	0

Experience by project and activity (continued): Each project number should correspond with the project listed on the previous page

Project Number (Corresponds to previous page)	Construct Artificial Burrows (No.)	Monitor project equipment and activities (Hrs/Days)	Oversee project compliance (Hrs/Days)	Supervise DT field staff (Hrs/Days) and No. staff supervised	DT fence Installation and Inspection (Hrs/Days)	Present DT Awareness Training (No.)
1.	0	520Hrs/40Days	520Hrs/40	20/6 1 Biologist	0	26
2.	0	0	0	0	0	0
3.	0	340Hrs/34Days	0	0	0	6

4.	0	0	0	570Hrs/ 57Days 4 Biologists	0	0
5.	0	0	0	240Hrs/ 25Days 5 Biologists	0	0
6.	0	160Hrs/15Days	15Hrs/2Days, Lead Field Biologist	0	0	4
7.	0	2060Hrs/ 160Days	2060Hrs/ 60Days Lead Field Biologist	2060Hrs/ 160Days 2-6 Biologists	0	34
8.	0	180Hrs/18Days	20Hrs/2Days Lead Field Biologist	0	0	6
9.	2	280Hrs/27Days	280Hrs/27Days Lead Field Biologist	0	160Hrs/16Days	5
10.	0	1260Hrs/ 115Days	1260Hrs/ 115Days Lead Field Bio	1260Hrs/ 115Days 2-4 Biologists	0	14
11.	0	0	0	440Hrs/45Days 1 Biologist	0	0
12.	0	0	0	120Hrs/ 15Days 2 Biologists	0	0
13.	0	0	0	160Hrs/ 20Days 1 Biologist	0	0

Summary of experience:

Total time spent for all desert tortoise-related field activities (referenced above):

Specify total number of hours:
OR Total number of 8-hour days: **1130 Days**

Total number of miles/kilometers walked conducting survey transects:

3700 Miles

Total number of wild, free-ranging desert tortoises you personally handled:

<100 mm: 17

≥100 mm: 63

Additional supervisory experience other than with desert tortoise work:

Project	Hours	Staff (No.)
Lynx Hair Snagging/Snowshoe Hair Sampling Transects, Wildlife Conservation Society	1800	2
Riparian Bird Surveys, BioWest Inc.	200	2
Black-footed Ferret Spotlighting Surveys, BioWest Inc.	480	7

I certify that the information submitted in this form is complete and accurate to the best of my knowledge and belief.

I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. Ch.47, Sec. 1001.

Signed:

Peggy Wood

Date: December 20, 2010

APPENDIX C

DOCUMENTATION OF BALD AND GOLDEN EAGLE ACT COMPLIANCE

----- Forwarded by Matt Stucky/Solar/Abengoa on 03/11/2011 06:17 PM -----

Ashleigh_Blackford@fws.gov

Ashleigh_Blackford

03/11/2011 06:00 PM

To: matt.stucky@solar.abengoa.com, Carol.Hammel-Smith@hq.doe.gov,
kimberly.mccormick@comcast.net, Matthew.Mcmillen@hq.doe.gov, jpatrovs@blm.gov,
Lyndon.Quon@aecom.com, lencinas@blm.gov, eweiss@dfg.ca.gov, afesnock@blm.gov,
cc: nrujanavech@blm.gov, ACrisp@energy.state.ca.us, AMartine@energy.state.ca.us,
Heather_Beeler@fws.gov, Eric_Kershner@fws.gov, Amedee_Brickey@fws.gov,
Ray_Bransfield@fws.gov

Subject: Abengoa Golden Eagle Measures

Matt and Group-

I have coordinated with our Migratory Birds office in our review of your proposed measures (below) to address compliance with CEC-BIO 10, and to incorporate into the Department of Energy 's NEPA document regarding the Bald and Golden Eagle Protection Act. We have determined that your measures will address compliance with BIO-10 and adequately demonstrate an effort to comply with the Bald and Golden Eagle Act. We recommend that Abengoa develop an Avian Bat Protection Plan (ABPP) to further address impacts on bats, migratory birds, and eagles, which may result from the development of the Mojave Solar project. Please refer to the Region 8 ABPP Wind Guidelines for more information. Please be sure the document clearly addresses the following topics:

1. Biological data, species known to occur, occurrence/densities by season, eagle breeding territories, migration routes, foraging habitat, wintering habitat
2. Risk assessment, both from construction activities, maintenance, and project operations. This should address direct and indirect effects, including collision with panels, habitat degradation and fragmentation, etc.
3. Avoidance and minimization measures.
4. Project operations mortality monitoring/risk validation; ensure that monitoring includes all aspects of the project (e.g., panels, utility lines, and evaporation ponds)
5. Compensatory Mitigation written within an adaptive management framework.

The elements outlined below should be included in the ABPP as a means to document the measures being implemented to address golden eagles. Please be advised that the ABPP does not limit or preclude the Service from exercising its authority under any law, statute, or regulation, nor does it release any individual, company, or agency of its obligations to comply with Federal, State, or local laws, statutes, or regulations, such as the Migratory Bird Treaty Act.

Measures Proposed by Abengoa Solar Inc.:

Abengoa Solar Inc. (ASI) has agreed to the following measures to ensure that any potential impacts to golden eagles resulting from construction and/or operation of the Mojave Solar Project (MSP) will be fully compensated. We would appreciate your concurrence with this email, as ASI is required to provide documentation to the California Energy Commission (CEC), pursuant to Condition of Certification BIO-10 of the CEC License Decision for the MSP, that the project is in compliance with the Bald and Golden Eagle Protection Act (BGEPA).

The measures agreed to by ASI are as follows:

1. Pursuant to CEC License Decision Condition of Certification LAND-1, ASI will mitigate for the loss of 128 acres of agricultural land recently under production on the plant site by providing for the purchase of 128 acres of

comparable agricultural land or an easement guaranteeing 128 acres of comparable land will be available in perpetuity for productive agricultural use. This will also provide foraging habitat for golden eagles within the project area.

2. Pursuant to CEC License Decision Condition of Certification BIO-20, ASI will ensure continuity of water delivery to the Harper Dry Lake ACEC by providing an alternate well able to effectively convey a minimum of 75 acre feet per year to the Harper Dry Lake marsh, which will also enhance and provide foraging habitat for golden eagles within the project area.

3. Pursuant to CEC License Decision Condition of Certification BIO-15, ASI will provide 118.2 acres of land suitable for desert tortoise, Mojave ground squirrel, and burrowing owl to compensate for the loss of habitat for these species on the plant site. The compensation land is located directly west of the MSP plant site and will provide suitable foraging habitat for golden eagles. ASI also will provide funding for the enhancement and long-term management of the compensation lands.

4. ASI will provide funding in the amount of \$60,000 into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). This money will be spent on monitoring and other actions that the Service, the Bureau of Land Management (Bureau), and the CEC determine would be beneficial to golden eagles located in a 10-mile radius of the MSP. ASI established this figure based on a 10-year breeding season monitoring program for the Black Mountain golden eagle territory within the 10-mile radius of MSP and an estimate of implementing a conservation action (e.g. road restrictions) in the vicinity of the Black Mountain nests, each costing approximately \$30,000. It is anticipated that the money will be used to implement these action or other actions agreed upon by the Bureau, the Service, and the CEC that would be beneficial to golden eagles within a 10-mile radius of the MSP. Other actions could include, but are not limited to, implementing road restrictions along Black Mountain Road by placing large boulders along the road in those sections directly alongside the golden eagle nests to discourage parking and loitering; implementing seasonal road closures of Black Mountain Road by erecting steel gates at the northern and southern ends of Black Mountain Wash; or funding Bureau staff to enforce seasonal restrictions.

Ashleigh Blackford
Wildlife Biologist
U.S. Fish & Wildlife Service
2493 Portola Road Suite B
Ventura, CA 93003
office: 805-644-1766 x 234
fax: 805-644-3958
ashleigh_blackford@fws.gov

APPENDIX D

DESERT TORTOISE EXCLUSION FENCING, CLEARANCE SURVEYS, AND TRANSLOCATION PLAN

MOJAVE SOLAR PROJECT

DESERT TORTOISE CLEARANCE AND RELOCATION/TRANSLOCATION PLAN

Submitted to:

**MOJAVE SOLAR, LLC
13911 Park Avenue, Suite 206
Victorville, California 92392**

Prepared by:

**Alice E. Karl, Ph.D.
P.O. Box 74006
Davis, California 95617**

March 2011

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MOJAVE SOLAR PROJECT

DESERT TORTOISE CLEARANCE AND RELOCATION/TRANSLOCATION PLAN

1.0 BACKGROUND

1.1 Project Description and Setting

Mojave Solar, LLC, (Mojave Solar) proposes to develop the 1,765-acre Mojave Solar Project (MSP or Project), approximately nine miles northwest of the town of Hinkley, California, in an unincorporated area of San Bernardino County (Figure 1). The Project is a 250 MW, parabolic solar thermal trough facility, the details of which can be found in the Biological Assessment (BA; U.S. Department of Energy [DOE] 2010). In summary, the Project includes the following:

- Within the Project Area (i.e., Project footprint) there will be two, independent Plant Sites (Alpha and Beta), each of which includes a solar electric generating facility with a nominal net electrical output of 125 megawatts (MW). Each Plant Site contains a solar array, power block and power generating equipment, support facilities and two evaporation ponds with a nominal surface area of 5 acres each (10 acres total, or 20 acres for the entire Project).
- The Project will connect to the Southern California Edison (SCE)-owned Kramer-Coolwater 220 kilovolt (kV) transmission line located adjacent to the southern border of the Project. SCE's new Lockhart Substation and most interconnection facilities will be entirely located within the boundaries of the southern portion of the Project Area. Part of the proposed "transmission line loop", will be located outside the Project boundary in the existing SCE right-of-way (ROW). Also outside the Project Area is SCE's proposed telecommunication system between Lockhart Substation and other regional substations. This will require that new fiber-optic cables be strung on existing and/or new transmission poles in SCE ROWs along one or more of three potential routes.
- Natural gas for the Project's ancillary purposes will be supplied by a pipeline owned by Southern California Gas (SoCal Gas) that runs to the Project boundary. No off-site pipeline facilities are proposed as a part of this Project.
- Water for all industrial and construction uses will be supplied from on-site groundwater wells. Drinking water will be produced using an onsite water treatment system to meet potable standards.
- A sanitary septic system and on-site leach field will be used to dispose of sanitary wastewater.

The Project is sited on formerly and currently farmed lands. Abandoned agricultural operations include crops, especially alfalfa, irrigated by center-pivot irrigation, as well as some livestock operations. Half of one center-pivot field is still farmed for alfalfa and wheat. Existing adjacent anthropogenic development includes the Solar Electric Generating Systems (SEGS) VIII and IX facility to the north-northwest and a few remaining residences. Other aboveground development includes SCE's Kramer-Coolwater 230-kV transmission line, which travels east-west, south of the Project, and the paved Harper Lake Road, which runs through the Project Area.

Relict native plant communities on the site exist in the corners of the center-pivot fields and consist of disturbed saltbush scrub (*Atriplex polycarpa* and *A. confertifolia*). There is also some saltbush scrub regrowth in the former dairy operation and formerly farmed fields west of Harper Lake Road, and northeast of Harper Lake Road. Areas surrounding the Project Area include developed or disturbed lands, native Mojave creosote bush scrub and native saltbush scrub. Harper Dry Lake and associated shoreline vegetation intersects the northeastern corner of the Project Area.

The topography is generally flat with elevations ranging from approximately 2,025 to 2,105 ft. The Project Area is covered by older alluvium consisting of dry, loose-to-moderately dense, silty fine-to-coarse sand with occasional gravel; subsurface layers of silt and possibly clay are likely to be present (Ninyo & Moore, 2006). In general, the hydrology of the Project Area, which was originally characterized by washes flowing northeast into the dry lake, has been disrupted by long-term farming.

Conservation areas in the Project vicinity include the Harper Dry Lake Area of Critical Ecological Concern (ACEC), adjacent and northeast of the Project Area (Figure 2). U. S. Fish and Wildlife Service (USFWS)-designated desert tortoise critical habitat abuts or is near the Project in the north, west and south. The U. S. Bureau of Land Management (BLM) has also designated the Superior-Cronese Desert Wildlife Management Area (DWMA) abutting the southern boundary of the Project and a Mohave Ground Squirrel Conservation Area to the south and east that overlaps the DWMA.

1.2 Desert Tortoise Occurrence in the Project Area and Vicinity

Desert tortoise focused surveys were conducted in April and May of 2007, 2008, and 2009 according to USFWS desert tortoise survey protocol (USFWS 1992). The survey area changed each year with refinements in the Project footprint, but was always a subset of the broadest area surveyed in 2007 - the Biological Resources Survey Area (BRSA) - which also included a one-mile buffer around the original Project boundary (see Mojave Solar [2009], Figure 5.3b in Section 5.3). Surveys in 2008 were conducted within an updated Project Area and out to one mile from the Project Area boundary. During 2009, supplemental protocol-level surveys for desert tortoise were conducted within select locations of the Project Area. (See Mojave Solar [2009] for a detailed description of surveys completed each year.)

The survey data (Figure 3) indicate that tortoises are unlikely to occupy the Project Area. Tortoise sign observed on the Project Area consisted of carcass parts and one full carcass of an immature tortoise; one old scat was observed in a center-pivot field, approximately 600 ft from the southern Project Area border. No recent scat and no burrows were observed. No live desert tortoise were documented on the Project Area during any focused surveys, although one tortoise was observed in the northeastern Project Area near a residence and along the southern Beta field border during surveys in 2006 for another project. Density on the Project Area is considered to equal zero. During the cumulative surveys, substantial quantities of tortoise sign were observed outside the Project Area to the east, west and south. (See Mojave Solar [2009], Section 5.3, for details of desert tortoise observations.)

2.0 Purpose, Background and Structure of the Plan

The purpose of this relocation/translocation plan (Plan) is to provide direction for the removal of tortoises from harm's way on the Project Area during all Project or Project-related activities (e.g., SCE telecommunications upgrades outside the Project Area). A draft Plan was submitted to USFWS, the California Department of Fish and Game (CDFG), and the California Energy Commission (CEC) in March 2010 (Karl 2010a). USFWS provided comments on 26 April 2010 (USFWS 2010a); CDFG provided comments on 6 May 2010 (CDFG 2010). This was followed by discussions between CDFG (E. Weiss and T. Moore), USFWS (A. Blackford), and A. Karl (representing Mojave Solar) on 13 and 21 May 2010. Since those conversations, USFWS guidance has changed repeatedly, with new translocation guidance issued as recently as August 2010 (USFWS 2010b). CEC provided comments on 25 January 2011. This updated Plan incorporates the original agency comments, as well as changes reflected in the more recent USFWS (2010b) guidance¹. Except where superseded by this recent guidance document and informal communications from USFWS, this Plan relies on formal guidelines from USFWS in December 2009 (USFWS 2009a). Finally, this version of the Plan incorporates relevant agency comments on a revised version submitted in November 2010. Because USFWS is in the process of analyzing desert tortoise translocation in general, relevant newer guidance will be incorporated into the Project relocation/translocation procedures as they become available. All future modifications to the plan will be approved by USFWS, CDFG, and CEC.

Biologically, translocation refers to moving an animal outside its home range. For desert tortoises, males generally have been shown to have larger home ranges than females in studies of sufficient duration and sample size (O'Connor et al. 1994; TRW 1999a), approximately 111.6 acres (range: 10.4–487.8 acres) (45.2 ha; range: 4.2–197.5 ha) for

¹ Although there have been many changes in USFWS policy since May 2010, MSP has received no formal or informal communications from CDFG since 6 May 2010 regarding CDFG translocation policy. However, based on conversations between Dr. Larry Lapre (BLM) and Dr. Karl, it appears that CDFG policy is consistent with the most recent USFWS (2010b) guidance. Mojave Solar is proceeding with this Plan under this assumption.

adult males and 43.5 acres (range: 4.7–143.3 acres) (17.6 ha; range: 1.9–58.0 ha) for adult females. These areas result in home range diameters of 2482 ft (752 m) for males and 1554 ft (470 m) for females. Studies of shorter duration or with a smaller sample size found smaller home ranges (e.g., Burge 1977, Barrett 1990, O'Connor et al. 1994, Duda et al., 1999). Home ranges for both genders (Duda et al, 1999) and for males, only, in one study (TRW 1999), decreased significantly in drought years.

USFWS terminology regarding translocation has changed repeatedly in the past year, as has the distance within which tortoises are considered translocated. Currently, the USFWS is attempting to use the phrases “tortoises translocated >500 m” and “tortoises translocated <500m” for any tortoises moved off of project sites, including during perimeter fencing. They are using the phrase “tortoises moved out of harm’s way” to describe tortoises that are moved off of linear facilities, such as access roads and pipelines outside a project site proper. This is not only awkward terminology for repeated use in a document, but it is likely to change again during USFWS’ continued analysis of desert tortoise translocation. For the purposes of this Plan and ease of use, the following simple terms, which are consistent with the 2009 *Desert Tortoise Field Manual*, will be used:

- Relocation – Moving a tortoise out of harm’s way to a point within that tortoise’s home range. This would include tortoises moved <500 m.
- Translocation – Moving a tortoise out of harm’s way to a point distant from the tortoise’s home range. This would include tortoises moved >500 m.

The structure of this Plan is first to describe general procedures applicable to all tortoise relocations/translocations: data collected on all tortoises; tortoise transportation; authorized handlers; and reporting. The Plan then addresses desert tortoise clearance and translocation during various Project phases, from site perimeter fencing through construction, restoration activities following construction, operations, and Project decommissioning. The reader is advised that this Plan is for desert tortoise clearance and translocation only. Other actions associated with tortoise protection measures (construction monitoring, fence construction and monitoring, etc.) are included in other, relevant documents, such as the BA (DOE 2010) and CEC license (CEC 2010). All avoidance, protection, and minimization measures that are identified in other Project documents for other biological and cultural resources will be implemented in concert with this Plan.

3.0 Procedures Applicable to All Relocations and Translocations

3.1 Data Gathered on Relocated and Translocated Tortoises

Each captured tortoise will be processed at capture, prior to translocation. The gender, carapace length, width along the widest area between and inclusive of Marginals 5 and 6,

height at the third vertebral, distinguishing morphology, clinical signs of disease, injuries (location, severity, source, state of healing), capture site location and description, and the amount of void, if any, will be recorded. In addition, the tortoise will be photographed and drawn. All release site locations will also be recorded at relocation/translocation, along with their descriptions. All tortoise handling will be accomplished by techniques outlined in the USFWS *Field Manual* (2009a: Sections 7.6-7.8) and including the most recent disease prevention techniques (e.g., Wendland et al. 2009). Each tortoise will be assigned an individual number, with a number series to be provided by USFWS. Marking techniques will be approved by USFWS, but temporary marks using very small epoxy numbers (e.g., clear epoxy over a small, indelible number on a correction fluid [Wite-Out®] background) on a costal or interior marginal area that receives little to no abrasion are suggested, with a Project-specific identifier. Such numbers will last for several years, which will facilitate identifying specific tortoises if they are subsequently observed during Project maintenance or other activities, including repeated observations during construction (e.g., on the perimeter fence).

3.2 Transmitters

If needed for monitoring relocated or translocated tortoises, transmitters will be affixed to the tortoises. Holohil R1-2B transmitters (24 mm wide by 11 mm thick; 14.9 g; www.holohil.com) will be epoxied onto a carapace scute using five-minute gel epoxy. For males, transmitters will be affixed to the fifth vertebral; for females, transmitters will be affixed to the anterior carapace in the most appropriate location for the animal's shell shape that will preclude interference with righting. The transmitter antenna will be fed through a plastic sheath with a diameter slightly greater than the antenna. This sheath will be epoxied low on the carapace, just above the marginal scutes, and split at the scute seams (growth areas) to preclude distortion of the tortoise's shell during growth. This technique permits the antenna to remain protected from abrasion, but move freely, thereby not affecting tortoise growth. Juvenile tortoises will be similarly equipped but with smaller transmitters, appropriate for their mass and size (<10% of the tortoise's mass). Because the antenna sheath is tightly curved on a very small tortoise, potentially constricting antenna movement with subsequent growth distortion, much more of the antenna will remain free on small tortoises. These are proven techniques to minimize disturbance to the tortoise, refined and/or developed and used by Dr. Karl for more than 20 yrs and on over 300 tortoises and subsequently used at Fort Irwin for several hundred tortoises.

3.3 Tortoise Transportation and Holding

Tortoises that only need to be moved a few hundred feet will be hand-carried to the release site. Each tortoise that is hand-carried will be kept upright and the handler, wearing disposable examination gloves (one pair per tortoise), will move the tortoise as quickly and smoothly as possible. Tortoises that must be moved farther from the capture site or temporarily held in a climate-controlled situation will be sequestered in individual, sterilized tubs with taped, sterilized lids or single-use cardboard boxes with lids. During transport by vehicle, the tortoise tub will be kept shaded and the tub will be placed on a

well-padded surface that is not over a heated portion of the vehicle floor. These measures are consistent with USFWS guidance (2009a: Section 7.10).

Should a tortoise void or defecate between capture and release, it will be thoroughly rinsed to remove potential attracting odors to predators. Then, it will be placed in a shallow bath of room temperature water to re-hydrate it, per USFWS guidance (2009a: Section 7.9). The tortoise's mass following this procedure will be recorded.

3.4 Handling Temperatures

Handling will adhere to USFWS (2010b) handling guidelines, which state that tortoises can only be handled when air temperatures, measured at 2 in (5 cm) above the ground (shaded bulb), are not expected to exceed 95°F (35°C) during the handling session. If the air temperature exceeds 95°F during handling or processing, desert tortoises will be kept shaded in an environment where the ambient air temperatures do not exceed 91°F (32.7 °C) and air temperature does not exceed 95°F. The desert tortoise will not be released until air temperature at the release site declines to 95°F.

Tortoises must go underground to escape surface heat at ground surface temperatures of 109°F (43°C) (Karl 1992) to 113°F (45°C) (Zimmerman et al., 1994). Because surface temperatures can easily exceed 109°F when air temperatures at two inches are still below 95°F, the more conservative temperature will govern all tortoise handling described in this Plan, to minimize harm to tortoises. In other words, the USFWS guidelines will be followed except in the situation where they exceed 109°F ground temperature.

USFWS (2009a, 2010b) has not provided guidance relative to handling temperatures for tortoises found during cold temperatures (e.g., less than approximately 50°F (10°C) except as they relate to moving the tortoise. This is addressed in the relevant sections below on relocation and translocation.

3.5 Authorized Handlers

USFWS describes a single designation for biologists who can be approved to handle tortoises - "Authorized Biologist" (AB) (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt; USFWS 2009a). Such biologists have demonstrated to USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately. Specific ABs will be approved to conduct specific tasks, including such specialized tasks as health assessments, blood sampling and transmitter attachment. Only those biologists authorized by USFWS, CDFG, BLM and CEC can conduct specific tortoise handling tasks and clearance surveys. For USFWS, ABs are permitted to approve specific desert tortoise monitors to assist in certain tasks, at the AB's discretion, without further approvals from USFWS. Direct supervision of monitors by the AB (i.e., voice and sight contact) is required for all clearance surveys and certain other specialized tasks, but limited tortoise handling (e.g., removal from harm's way) may occur without supervision, following appropriate training and approvals from the AB.

CEC has slightly different names for approved biologists - “Designated Biologist” (DB) and “Biological Monitor” (BM) – and slightly different qualifications. For the MSP, the DB must meet current USFWS AB criteria and BMs involved in desert tortoise surveys and handling must also meet AB criteria. CDFG, BLM and CEC must approve both the DB and all BMs for the specific activities requested. For the purposes of this Plan, the term BM will follow the USFWS definition, thereby indicating those biologists who have been approved by the DB for certain tasks. However, only BMs who have also been approved by the BLM, CDFG, and CEC may handle or survey for tortoises.

4.0 Clearance and Relocation/Translocation During Specific Project Phases

Tortoise relocation/translocation that is necessary during Project construction may occur during initial perimeter fence construction, tortoise clearance from the Plant Site and Lockhart Substation (i.e., all facilities inside the Project Area), and initial grading on the Project Area. Based on the survey results, it is anticipated that no or very few desert tortoises would require removal from the Project Area. Tortoises may also be moved from harm’s way during the SCE installation of the fiber optics line and associated poles. While unlikely, a tortoise could be found on the Project Area during operations. Relocation/translocation may also occur during decommissioning.

No tortoises will be handled until the Biological Opinion is implemented. Similarly, because a tortoise could be in a burrow, no burrows that a tortoise could use will be collapsed unless the end of the burrow and the entire length of both sides definitely can be felt. Alternative methods to determine occupancy (e.g., shining a light into the burrow, scoping with a fiberoptics scope, gating the burrow with small sticks) will not be considered definitive because those methods have limitations depending on the shape of the burrow and the season.

4.1 Project Area Perimeter Fencing and Temporary Fencing

Prior to the onset of Project Area tortoise clearance, both Plant Sites (Alpha and Beta Sites) and Lockhart Substation will be fenced with permanent, tortoise exclusion fence per USFWS (2009a) guidelines, to keep tortoises in habitat adjacent to the Project Area from entering during construction and operations phases. The permanent fence around the Plant Sites will also include the entire drainage channel, except where it goes under Harper Lake Road. There, both sides of the road will be fenced. Tortoise exclusion fence will be attached to the MSP permanent perimeter fence. Exclusion fence material will be galvanized one-inch by two-inch vertical wire mesh fence, extending at least two feet above the ground and buried at least one foot. Although unlikely, where burial is impossible, the mesh will be bent at a right angle toward the outside of the fence, at or below ground level, with the bent portion anchored by stakes and further held down by rocks and soil to prevent tortoises from digging under the fence. Tortoise-proof gates will be established at all site entry points, to remain closed except during entry by vehicles. If

shown to be effective and not potentially dangerous to tortoises, tortoise “cattle guards” may be installed instead of or in addition to gates.

Temporary fencing may be used to exclude tortoises from the Project Area until the permanent fence is installed. Should any work outside the fenced Project occur where tortoises are possible, temporary fencing may be installed where the AB believes that it would provide better protection than monitoring by BMs. Temporary fencing will follow guidelines and materials for permanent fencing except in very temporary situations, when silt fencing may be used. Rebar may replace t-stakes or chain link poles for temporary fencing. In both cases, supporting stakes will be sufficiently spaced (e.g., ≤ 8 ft for wire mesh; ≤ 5 ft for silt fencing) to maintain fence integrity. Fencing may be buried if it would not create a biologically significant disturbance (i.e., along the Project Area boundary) or, if it is outside the Project Area boundary where surface disturbance could be biologically significant, it will be bent outward at the ground level, with the bent portion tacked and/or held down by rocks, soil, and/or ground staples; anchors will be driven a minimum of every two feet.

4.1.1 Project Area Perimeter Fencing Schedule

Project Area perimeter fencing is planned for installation prior to April 2011, with tortoise clearance and relocation/translocation beginning in April 2011. Should this schedule change, or construction phasing occur, then the same criteria expressed in this Plan to ensure that tortoises are safe during construction, clearance and relocation/translocation procedures still will be implemented.

4.1.2 Surveys and Monitoring during Fence Construction

Within 24 hours prior to fence installation, biologists will survey the staked fenceline for all burrows that could be used by tortoises and for tortoises. Surveys will provide 100% cover for all areas to be disturbed by fencing and a swath of at least 90 ft centered on the fenceline, using 15-ft-wide transects. Tortoise burrows will be mapped using Global Positioning System (GPS), and the size and occupancy recorded; if not occupied, indications of how recently the burrow was used will be recorded. Occupancy will be determined by a combined use of reflective mirrors, probing, tapping the entrance, listening, and/or scoping with a fiberoptics scope. In all cases, occupancy will only be verified if all interior edges of the burrow can be felt, such that a “hidden” chamber at the end is not missed. Any tools used inside a burrow that could be used by a tortoise will be disinfected between use in another burrow, via the most recent disease prevention techniques (e.g., Wendland et al. 2009).

Burrows also will be flagged if they would not be likely to attract poaching. Burrows will be avoided if at all possible (especially if this is temporary fencing). But, if a burrow must be destroyed for fencing to occur, then it will be visually and tactilely examined for occupancy by tortoises and other wildlife. If occupancy is negative or cannot be established, the burrow will be carefully excavated with hand tools, using standardized techniques approved by USFWS (2009a) and the Desert Tortoise Council (1994),

including disinfection techniques for all tools. No burrows that can be avoided will be collapsed during perimeter fence construction.

All fence construction will be monitored by approved biologists to ensure that no desert tortoises are harmed. The level of monitoring will depend on the specific fencing activity, but at least one BM will accompany each separate construction team, such that no driving, trenching, fence pulling, or any surface disturbing activities will occur without the immediate presence of a BM. Maps of burrows from the pre-construction survey will be provided to all BMs to assist in protecting tortoises. Such maps will also be potentially useful for relocating tortoises.

Following the onset of the tortoise activity season, or if exclusion fencing is installed when tortoises are known to be active (for example, if unusually warm weather occurs in winter before fencing is completed), then all installed exclusion fence (partial or complete) will be checked ensure that no tortoise is trapped inside the Project Area. If fencing is installed during a warm period in winter, then all fencing will be checked twice daily, during the warmer periods of the day. Any tortoise would be relocated as described in Section 4.1.3, Tortoise Relocation Methods during Fence Construction, below. If fencing occurs during spring or summer (approximately 1 April through September), then all fencing will be checked 2-3 times daily during tortoise activity temperatures (between approximately 15 and 42°C ground surface temperature), for two weeks, to ensure that a tortoise is not inadvertently trapped inside. Tortoises would be passively or actively relocated as identified below in Section 4.1.3 and Table 1. If, for any reason, tortoise clearance surveys were delayed for several months after fencing, at least one clearance pass would be completed as soon as tortoises became active following the completion of fencing (e.g., April if fencing were completed in winter, immediately after fencing if fencing were completed from April through October); see Section 4.2.1, Clearance Surveys, below. These measures would ensure that no tortoise were trapped into the non-habitat inside the site following fencing.

4.1.3 Tortoise Relocation Methods during Fence Construction

Tortoises will be avoided if at all possible. Fence gaps and erection of temporary fencing will be used to “encourage” a tortoise to return to the outside of the fence. For instance, if an active tortoise is observed inside the Project boundary, construction and equipment can be temporarily moved to another section of the fence, a large gap can be left in the fence nearest the tortoise and a temporary (e.g., silt) fence can be quickly constructed from the gap edges well around the tortoise so that it moves through this channel to the outside of the Project. Following exit from Project Area, the tortoise would then be immediately monitored as identified below in Section 4.1.5, Post-Release Monitoring.

Any tortoise that must be moved during perimeter fencing will be relocated immediately outside the construction zone, but onto MSP land (Figure 4). Release points will be as close as possible to the capture point, to keep tortoises within their home range, but will always be on or immediately adjacent to suitable habitat. Specific release points cannot be identified at this time without knowing where tortoises are, but the highest likelihood

of finding a tortoise along the perimeter fence is along the southern, eastern and northeastern border of the Beta Site and the western border of the Alpha Site (Figure 4).

Generally, tortoises will be placed in the shade of a shrub or, if known, in the entrance of that tortoise's burrow (but see below in the event that ambient temperatures are high). The most recent USFWS guidance (USFWS 2010b) states that all "perimeter fence" tortoises be moved to the interior of the Project Area. Because the solar project site has limited desert tortoise habitat and is expected to support few if any desert tortoises, which is supported by the limited amount sign and burrows on the proposed solar fields, it is believed that any individual found during fence construction maintains a territory outside of the solar project site and is utilizing the project area for foraging or movement. Therefore, desert tortoises on the MSP project found during fence construction will be placed outside of the solar project site rather than inside.

All tortoises relocated from harm's way during perimeter fencing will be translocated as described in Section 3.2, above. The exception will be tortoises brumating (~hibernating) in burrows during winter (see below for a discussion of handling tortoises outside of USFWS temperature guidelines).

USFWS guidance (2009a, 2010b) regarding translocation temperatures states that translocation occur when air temperatures at 2 in (5 cm) above the ground, are not forecast to exceed 90°F (32°C) within three hours of release and 95°F (35°C) within one week of release; additionally, daily low temperatures should not be cooler than 50°F (10°C). The rationale for the higher temperature constraints is that tortoises must find or dig new refuges in the potentially unfamiliar translocation area prior to the onset of lethal daily temperatures. Along the perimeter fence line, however, tortoises would be moved only a short distance, within their home ranges, where they are knowledgeable about the locations of refuges. USFWS (2010b) has agreed that relocation on linear facilities, including perimeter fencing, may occur during any time of the year. The only high temperature constraint is that no tortoise will be moved when air temperatures are expected to exceed 90°F (32°C) within three hours of release.

Although fence construction is currently planned for February to March 2011, schedules may change. Fence construction is permitted by USFWS for any time of the year, so air and ground temperatures will exceed lethal levels in the warmer months or may be lower than 50°F during some winter days and evenings. Contingencies must be in place in the event that a tortoise must be relocated. The following options to protect tortoises address potential contingencies during periods of high temperatures. (Note, however, that no tortoise would be moved when air temperatures exceed 95°F, except in an emergency.) A summary of these activities is found in Table 1.

If a tortoise is found under a shrub, a temporary fence can be erected along the construction zone to keep the tortoise from entering the construction area. (These would be linear sections of fence separating the tortoise from the construction, not pens around the tortoise.) The fence will be flagged to ensure avoidance. Fencing will be 1 by 2-inch mesh or other, adequate temporary fencing (e.g., silt fencing

Table 1. Alternatives for Relocating or Translocating Tortoises Found During Periods of Ambient Temperatures Outside the USFWS (2009a, 2010b) Translocation Guidelines. Note that in all cases, no tortoises will be handled during air temperatures at two inches above the ground that exceed 95°F.

Project Phase	Project Activities	Alternatives for Relocation or Translocation ¹		
		During Periods of High Temperatures		During Winter ²
		Tortoise Found Under Shrub	Tortoise Found In Burrow	
Construction	Construction of Project Area perimeter fence; tortoises on Harper Lake Road; SCE telecommunications upgrades and interconnection construction outside the Project boundary	<ul style="list-style-type: none"> Relocate to known burrow; monitor Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate Temporarily move construction to another area Collect and hold in climate-controlled facility; release in evening or the following morning; monitor 	<ul style="list-style-type: none"> Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate If cannot be avoided, collect and hold in climate-controlled facility; release late afternoon/early evening or following morning; monitor 	<ul style="list-style-type: none"> If cannot be avoided, place tortoise in artificial burrow, temporarily block in and monitor; remove block at two weeks (or earlier depending on the weather) and monitor If tortoise fails to find suitable winter burrow and will not use artificial burrow, hold in climate-controlled facility, in the dark at temperatures simulating burrow temperatures, until seasonal temperatures warm and tortoises are active; release within 100 ft of capture burrow; monitor
	Grading of Project Area; tortoises trapped inside Project Area after fencing	<ul style="list-style-type: none"> Capture and hold in climate-controlled facility, contact USFWS and CDFG for direction 	<ul style="list-style-type: none"> Capture and hold in climate-controlled facility, contact USFWS and CDFG for direction 	Not applicable
Operations	Plant Sites	<ul style="list-style-type: none"> Capture and hold in climate-controlled facility, contact USFWS and CDFG for direction 	<ul style="list-style-type: none"> Capture and hold in climate-controlled facility, contact USFWS and CDFG for direction 	Not applicable

	Access road, utilities maintenance	<ul style="list-style-type: none"> • Allow tortoise to proceed out of area unimpeded; monitor • Relocate to known burrow; monitor • Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate • Temporarily move construction to another area • Collect and hold in climate-controlled facility; release in evening or the following morning; monitor 	<ul style="list-style-type: none"> • Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate • Collect and hold in climate-controlled facility; release late afternoon/early evening or following morning; monitor 	<ul style="list-style-type: none"> • If cannot be avoided, place tortoise in artificial burrow, temporarily block in and monitor; remove block at two weeks (or earlier depending on the weather) and monitor • If tortoise fails to find suitable winter burrow and will not use artificial burrow, hold in climate-controlled facility, in the dark at temperatures simulating burrow temperatures, until seasonal temperatures warm and tortoises are active; release within 100 ft of capture burrow; monitor
Decommissioning	Project decommissioning and site restoration, outside fenced areas	<ul style="list-style-type: none"> • Relocate to known burrow; monitor • Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate • Temporarily move construction to another area • Collect and hold in climate-controlled facility; release in evening or the following morning; monitor 	<ul style="list-style-type: none"> • Erect temporary fence between tortoise and construction; monitor; remove fence when appropriate • If cannot be avoided, collect and hold in climate-controlled facility; release late afternoon/early evening or following morning; monitor 	<ul style="list-style-type: none"> • If cannot be avoided, place tortoise in artificial burrow, temporarily block in and monitor; remove block at two weeks (or earlier depending on the weather) and monitor • If tortoise fails to find suitable winter burrow and will not use artificial burrow, hold in climate-controlled facility, in the dark at temperatures simulating burrow temperatures, until seasonal temperatures warm and tortoises are active; release within 100 ft of capture burrow; monitor

¹ See the text for the details of each alternative.

² Winter is defined as the period when tortoises are brumating, approximately 1 November to 1 April.

can be used for very short-term needs). If practical, the fence would be removed later in the day (or several days later if needed to protect the tortoise) when the tortoise could be allowed to move away from the construction area of its own accord (preferred) or safely moved. If the tortoise must be handled, it would be processed and transmitters.

If the AB determines that leaving the tortoise under a shrub would potentially result in overexposure to high temperatures and no burrow is known for that tortoise, construction in that area will halt and all personnel will depart. Construction can be resumed later in the day when air temperature has dropped below 95°F. Less preferably, the tortoise can be collected in a sterile, covered tub, held in a climate-controlled location (e.g., Project office), transmitters, and released in early evening, when air temperature has dropped below 95°F or the following morning. All boxed tortoises would be checked several times until release, to ensure their safety. All released tortoises would be visually monitored until they found a suitable burrow. At the AB's discretion, if this tortoise's burrow is known, the tortoise can be placed at that burrow and watched until it enters the burrow.

- *If a tortoise is in a burrow that can be avoided*, a temporary fence will be erected to keep the tortoise from entering the construction zone, in the same manner as described above for a tortoise under a shrub. The fence will be flagged to ensure avoidance.
- *If a tortoise is in a burrow that cannot be avoided by construction activities*, then the tortoise will be collected in a sterile, covered tub, held in a climate-controlled location (e.g., Project office) until early evening, when air temperature has dropped below 95°F. At that time, the transmitters tortoise will be released outside the Project Area fence within a few feet of the point of collection. It will be followed until it either finds a suitable burrow or night falls. (If this exercise occurs in the morning, the threshold will be air temperatures exceeding 95°F.) If no suitable burrow has been found, the tortoise would be again tracked in the morning until it finds a suitable burrow or the threshold temperature has been reached. If the latter occurs, the tortoise will again be collected and the process repeated that evening. Because tortoises use many burrows, it is anticipated that the tortoise would locate a suitable burrow quickly.

If fencing occurs during winter when tortoises are inactive (approximately 1 November to 1 April), tortoises found in burrows will be avoided, and the burrow fenced with high visibility fencing (if this would not attract poaching) and mapped on construction drawings; a biological monitor will continually monitor the burrow and fence while construction is proceeding in the immediate area of the burrow, to ensure tortoise safety (Table 1). The high visibility fencing will be removed once all danger of construction is

past. A brumating tortoise will not be removed from its burrow for the sole purpose of transmittering it. If a tortoise in a burrow that cannot be avoided² and tortoises are still in brumation, then an artificial burrow that replicates the capture burrow (i.e., location relative to a shrub, direction, length) will be constructed as nearby as possible outside the Project fence and in an area where construction has finished (i.e., the tortoise will not be disturbed). All burrows that cannot be avoided will be completely excavated using standardized techniques approved by USFWS (2009a) and the Desert Tortoise Council (1994). The tortoise will be captured at night, affixed with a transmitter and placed in the artificial burrow along with soil and scat from the capture burrow. The tortoise will be blocked into the burrow for two weeks (unless the weather warms, in which case the barriers will be removed), at which time the blocks will be removed and the tortoise continually monitored to ensure that it either remains in the burrow or finds another suitable burrow. If the tortoise fails to find a burrow in several days, and the nighttime air temperatures fall below approximately 50°F, then it will be captured and held in a climate-controlled, dark, quiet, and safe location (e.g., room in Project office) at an air temperature equivalent to the air temperature one meter inside a natural burrow, until seasonal temperatures warm and tortoises are observed to be active in the area. At that point, it will be released within 100 ft of its capture burrow and monitored as described in Section 4.1.5, Post-Release Tortoise Monitoring, below.

Any tortoise found aboveground during winter is highly likely to be near its burrow, except during extended periods of warm weather. A transmitter will be affixed to the tortoise and it will be tracked daily until it is established that the tortoise is sequestered in a suitable burrow.

4.1.4 Health Considerations

Visual health assessments will be conducted on all tortoises relocated during site fencing (i.e., moved <500 m), by an experienced biologist approved by the USFWS. USFWS (2010b) guidance and later e-mails from USFWS (T. Engelhard, pers. comm. to A. Karl) have identified that no tortoise will be relocated within 1.5 km (0.9 mi) of a diseased resident tortoise because relocated tortoises may move 1.5 km after translocation. Mojave Solar will comply with the requirement to complete a 100%-coverage survey for resident diseased tortoises within 1.5 km of any relocated tortoise (Figure 4). However, surveying for such resident tortoises would be problematic during the anticipated time when fence construction is occurring, February-March 2011, because tortoises will be underground, brumating. Also, USFWS' rationale is highly unlikely to apply to the Project, since any tortoise that must be relocated from the Project Area likely will be moved only a few meters. The USFWS anticipates that such "relocated tortoises typically remain within their home range" (USFWS 2010b:27). Based on these factors, alternatives may be discussed with USFWS following relocation of all tortoises during perimeter fencing activities.

² This could occur where the permanent fence was the first and only perimeter fence constructed.

No tortoise with clinical signs of mycoplasmosis will be relocated. Schumacher *et al.* (1997) observed that clinical signs had a high statistical correlation with positive serology (i.e., exposure to *Mycoplasma agassizii*). A mucous nasal discharge was the clinical sign that was the most reliable predictor (93% of tortoises with a mucous nasal discharge were seropositive), although it could be caused by pathogens other than *M. agassizii*. Furthermore, a purulent nasal discharge was the only clinical sign that was relatively objective; other clinical signs were far more subjective, were potentially present for other reasons, and reduced the statistical predictability of positive serology. For the MSP, a purulent nasal discharge will be the threshold to identify a diseased tortoise, unless USFWS determines that other clinical signs should be used for diagnosing a diseased tortoise.

Desert tortoises determined to be infectious or unhealthy will be sent to the Desert Tortoise Conservation Center (DTCC) or other USFWS-approved facility where they will undergo further assessment, treatment, and/or necropsy. Mojave Solar will provide a flat fee of \$9,000 for each desert tortoise sent to the DTCC commensurate with the cost to provide housing, care, treatment, and other services for five years (\$3,000 for Year 1, \$1,500 for Years 2 to 5).

4.1.5 Post-Release Tortoise Monitoring

While tortoises moved a short distance from construction activities along the perimeter fence would be assumed to be within their home range and familiar with burrow locations, they would receive immediate post-release monitoring. This may be especially critical for juvenile tortoises, which are highly subject to depredation. Any tortoise moved will be watched for at least one hour to determine if it is behaving safely (e.g., seeking shade or a burrow) or if it is likely to try and re-enter the construction area. Because each relocated tortoise will have a transmitter, it will also be located via telemetry for the next two days during tortoise activity temperatures to ensure that the tortoise is not fence-walking and is using burrows. .

As described above in Section 4.1.3, Tortoise Relocation Methods during Fence Construction, any tortoise moved in the evening during a period when daily air temperatures exceed 95°F (late April through early October) will be followed until it either finds a suitable burrow or night falls. (If this exercise occurs in the morning, the threshold will be air temperatures exceeding 95°F by which a tortoise must find a suitable burrow.) If it has not found a suitable burrow, the tortoise would be again tracked in the morning until it finds a suitable burrow or the threshold temperature has been reached. If the latter occurs, the tortoise will again be collected, held in a climate-controlled environment and the process repeated that evening. Because tortoises use many burrows, it is anticipated that the tortoise would locate a suitable burrow quickly.

USFWS (2010b) requires a five-year monitoring program for translocatees, including tortoises removed from the perimeter fence. Mojave Solar will monitor all transmitted tortoises for five years from the time of relocation/translocation. Based on multiple Project surveys, it is assumed that fewer than five tortoises will be part of the study.

USFWS (2010b) has determined that no resident and control study cohorts are required for fewer than five translocatees. The Ventura Field Office (VFO) requires that juveniles be counted in the total for monitoring but recognizes the difficulty in obtaining juvenile control and recipient cohorts. So, if mostly juveniles are translocated, then USFWS will consider a modification of the five-year monitoring program. If five or more desert tortoises are translocated from the project site, Mojave Solar will work with the BLM, CDFG, USFWS, and CEC to identify appropriate locations for control and resident desert tortoise monitoring.

Based on the requirements from the USFWS (2010b), the following elements will be part of the monitoring program:

- Tortoises will be located by telemetry according to the schedule identified in USFWS (2010b) guidelines. Each time the tortoise is located, the behavior, location (UTM), and burrow description (if any) will be recorded.
- Survival and general health will be monitored through body condition indices (mass to volume ratios), clinical signs of disease, serology, and inspection for injuries. Any time a tortoise is handled, it will be examined for clinical signs of disease. Formal health assessments will be conducted during April (following brumation), July (following oviposition), and October (prior to brumation). At these times, body condition (mass to volume ratio) also will be measured (mass, carapace length, width at Marginal 5 or 6, height).
- Blood samples will be taken and analyzed annually, in July or October. An approved biologist will conduct the assessments and tissue sampling. While blood samples are not required of tortoises moved <500 m during relocation, blood will be sampled shortly after relocation³ in order to provide baseline data.
- Sampling frequency and techniques for disease analysis will be updated as necessary during the study, based on the newest disease information from this and other studies. This may include tests for other pathogens (e.g. *Mycoplasma* spp., herpesvirus, iridovirus) as their importance and evaluation techniques become validated for desert tortoises. Data will be recorded on a data sheet similar to that in Appendix 1, with an additional health assessment data sheet to be provided by USFWS.

³ USFWS (2010b) requires that blood sampling be conducted no sooner than 15 May, “based on activity of the immune system.” This premise is currently under scrutiny (e.g., e-mail from M. Brown, University of Florida Mycoplasma Lab, to K. Fields, USFWS, 8 October 2010).

- Any health problems observed (*e.g.*, rapid declines in body condition, perceived outbreaks of disease, mortality events) will be reported to the USFWS, CDFG and BLM⁴ such that appropriate actions can be taken in a timely manner.
- Should a transmittered tortoise die, the cause of death will be determined to the extent possible. This information, along with the location and any other analysis that could assist the USFWS, CDFG, BLM and DOE will be provided to these agencies within 48 hours, verbally, or five business days, if by e-mail. All fresh carcasses will be salvaged and frozen. They will be submitted for necropsy upon direction from USFWS, CDFG, and BLM; DOE will also be notified.
- Transmitters will be changed as necessary.

USFWS' stated purpose for this study is "to evaluate the effectiveness of translocation as a take minimization measure" (USFWS 2010b). Part of USFWS' rationale for monitoring perimeter fence tortoises is to assess the impact of the new barrier to movement in their home range (A. Blackford, USFWS, pers. comm. to A. Karl). Recognizing the site-specific conditions (*i.e.*, the existing and historical agriculture is already a barrier to use), as well as the anecdotal results from such a small study cohort, USFWS has expressed interest in discussing other research questions. Mojave Solar offers the following research questions for discussion, if fewer than five tortoises are moved:

1. What is the survival of tortoises following relocation and short-distance translocation until tortoises settle into home ranges?

Background and Rationale - Tortoises that may be relocated or translocated from the Project Area currently reside outside the site, as evidenced by the complete lack of burrows and only one old scat within 200 m of the border in three years of surveys (not including the 2006 reconnaissance). Therefore, since tortoises in the area are already accustomed to the area outside the site, moving them outside again, should they happen to be on the site at the time of clearance, merely moves them into an area with which they are already familiar. It seems far-fetched to assume that they would experience the same stressors that a tortoise translocated into unfamiliar territory would experience. So, mortality or harm due to relocation or translocation seems highly unlikely.

Approach - Mojave Solar would monitor all transmittered tortoises for 2.2 years, from the time of relocation/translocation (expected March 2011) through May 2013. All monitoring elements described above for the USFWS monitoring program would form the basis of the monitoring program. A period of 2.2 years is

⁴ Although no relocation sites are located on BLM land, these sites are immediately adjacent to BLM land, so most relocated tortoises will use BLM land. One translocation site is on BLM land. Consequently, BLM will be included in all decisions relative to tortoises in relocation/translocation areas.

being proposed because two translocation studies have identified that translocated animals exhibit similar movement patterns as resident animals (i.e., settle into new home ranges) in approximately nine months to two years following translocation to an unfamiliar area (Nussear 2004, Karl and Resource Design Technology, 2007)

2. How do tortoises respond to a large barrier fence in their home range following relocation and short-distance translocation?

Rationale – In general, to answer this USFWS question, it would be useful to monitor tortoises that live in the immediate area of the fence more closely than the weekly and bi-weekly schedule proposed by the USFWS. This would provide information on a tortoise's use of the area relative to the tortoise's proximity to the fence. A temporal component would provide information on how that use changed following fence installation.

At MSP, tortoises already do not use the Project Area because long-term agriculture has virtually eliminated tortoise habitat there; even the center-pivot corners and former residential area in the north are very small and disturbed. So, the Project presents a special situation whereby the Project fence should have a negligible effect on normal tortoise behaviors.

Approach - Mojave Solar would track all translocated tortoises twice a day during the height of the activity season (March to May and October-November). (During the remainder of the year, the monitoring schedule for #1, above would be maintained.) Wildlife cameras might be used to augment fence line sampling for tortoises that reside very close to the fence, or were frequently found there. The study would last the same length of time as #1, above. All locations and behavior would be recorded. Data analysis would examine the density of above-ground locations and burrows with respect to distance from the fence; covariates would include time since translocation, gender, and tortoise size.

Per USFWS (2010b) guidelines, triggers for implementation of adaptive management will be developed through coordination with USFWS, CDFG, BLM and DOE.

4.1.6 Nest Relocation

Any nests found between November 1 and April 15 are unlikely to be viable and will not be moved; hatching is typically completed by October. In the event that nests are found between April 15 and October 31, the nests will be moved. Eggs will be inspected to determine if they are viable and, if so, will be moved to an identical microsite (e.g., cover, plant species, soil type, substrate, aspect) on the approved Translocation Site (see Section 4.2.2, Translocation Release Areas and Designated Translocated Site, below) using standard techniques (e.g. Desert Tortoise Council 1994, USFWS 2009a). Translocated nests will be fenced with open-mesh fencing (e.g. 2-inch wide mesh) that will permit hatchlings to escape but prevent depredation by canids that might be attracted

to the new nests by human scent predator entry. Open-mesh fencing or avian netting also will be installed on the roof of the nest enclosure to prevent predator entry. Nests will be monitored from a 30-foot distance once a month until late November, at which time they will be excavated for examination. If possible, hatchlings will be weighed, measured, photographed, described and marked.

4.1.7 Monitoring Fence Integrity

All permanent exclusion fencing will be inspected monthly and during/immediately after all rainfall events where soil and water flow through washes or overland and could damage the fence or erode the soil underneath. Temporary fencing will be inspected at least weekly if construction is occurring; if there is a delay in construction, temporary fence inspections will follow the same schedule as for permanent fencing. Any damage to any fencing, either permanent or temporary, will be repaired immediately. If it cannot be repaired immediately, any gaps that are open to tortoise habitat will be continuously monitored until the gap can be repaired, to ensure that a tortoise has not entered the site through the gap. For permanent fencing, gaps must be repaired within two days. In any instance where a fence gap may have permitted tortoise entry, the AB shall inspect the area enclosed by the fence for the tortoise. The size of this survey area will depend on the distance inside the facility to which the tortoise may have traveled and will be at the AB's discretion.

4.2 Plant Sites and Associated Facilities inside the Project Area

4.2.1 Clearance Surveys

A clearance survey for tortoises will be conducted inside the completed perimeter Project boundary tortoise fence or suitable temporary fence. Clearance surveys will coincide with heightened tortoise activity to maximize the probability of finding all tortoises. These periods occur from April through May and during late September through October (and often into early November).

Currently, Project Area perimeter fencing is planned for installation in Winter 2011, with tortoise clearance and relocation/translocation beginning 1 April, or as soon as tortoises in the area are found to be consistently active. (Clearance earlier than 1 April would have to be approved by USFWS, and CDFG, as well as CEC, in consultation with CDFG and USFWS.) Construction is scheduled to begin after tortoise clearance, probably from July to September 2011. Surveys would begin approximately 1 April, with two passes completed by approximately 10 April. For tortoise translocation to be successful in spring, clearance must be completed in early April to meet appropriate translocation temperatures. Tortoises must be relocated or translocated from the Project Area at least one week before daily, midday temperatures are expected to exceed 95°F (35°C) air temperature (at 2 in) or 109°F (43°C) ground surface temperature (see discussion in Section 4.1.3, Tortoise Relocation Methods during Fence Construction, above) whichever is lower. The rationale is that tortoises must find or dig new refuges in the potentially unfamiliar translocation area, prior to the onset of lethal daily temperatures. Mojave

Solar intends to begin grading the entire Project Area after tortoise clearance surveys, so all tortoises must be removed prior to grading.

Should this schedule change, or construction phasing occur, then the same criteria expressed throughout this Plan to ensure that tortoises are safe during construction, clearance and relocation/translocation procedures will be implemented for separate phases. It is always important to consider that Project scheduling may change, resulting in Project Area clearance surveys being conducted outside temperatures that are higher than the USFWS guidelines for translocation. Clearance surveys may be conducted during periods of elevated tortoise activity: April, May, September and October when ambient temperatures at 2 inches (5 cm) do not exceed 104°F (40°C; USFWS 2010a and b). But much of this period is well past the time when it is safe to translocate in spring or prior to safe, autumn translocation temperatures. Generally, in either event, any tortoise found would be monitored onsite, via telemetry, until the next period when ambient temperatures permitted translocation. However, because there is so little habitat on the Project Area, and arguably not enough to support a tortoise, if fencing is completed from April through September, then clearance surveys will occur immediately after fencing is complete to ensure that no tortoise is trapped inside the Project boundary. (Note also that fence checks would be conducted twice daily for fence-walking tortoises – see Section 4.1.2, Surveys and Monitoring during Fence Construction, above.) It would be prudent to consider relocating or translocating this tortoise prior to the following “safe” translocation period. So, if a tortoise is observed during clearance surveys when ambient temperatures are likely to be too high for translocation (i.e., mid-April and early October), then: (1) the tortoise will be “encouraged to exit the Project Area by the use of openings in the fence and temporary, open-ended “corrals” (see Section 4.1.3, above); or (2) the tortoise will be monitored onsite to see if it has a burrow and could be reasonably monitored onsite until the following safe translocation period; or (3) CDFG and USFWS will be contacted to determine methods of release for that tortoise. If, through monitoring onsite, the tortoise is found to have one or more burrows and ample forage, it would be tracked at least once per week during high activity seasons (April through June, September) and twice per month during diminished activity seasons (July and August), until translocation.

Per USFWS (2010b) guidelines, a minimum of three, 100% coverage clearance passes will be completed. For the Project Area to be deemed cleared of tortoises, no additional tortoises may be found on the two, final, consecutive clearance passes. If a tortoise is found on one of these passes, two clean passes (i.e., no new tortoises) must follow before the Project Area can be declared to be cleared of tortoises. In this event, and because of the broad fields of non-habitat, it would not be necessary to complete another clearance of the entire Project Area, but instead only that portion of the site where the tortoise was found. For instance, if a tortoise were found in a center pivot corner, where degraded relict habitat remains, that corner, as well as all other connected habitat and a several hundred meter band into the farmed field, would be searched.

Clearance transects generally will be 15 ft wide. Transects narrower than 15 ft wide will be used if dictated by dense shrub vegetation or where visibility is otherwise

compromised. Wider transects during the second and third passes may be requested of USFWS on the shrub-less crop fields, depending on the height and nature of the vegetation there and the results of the first clearance pass. On each subsequent pass, an attempt will be made to view all shrubs and the terrain from as many angles as possible. To achieve this, transects programmed into GPS units will be either perpendicular, parallel but offset, and/or approached from the opposite direction on each subsequent pass (Karl and Resource Design Technology, Inc., 2007).

All tortoise sign will be mapped and evaluated (e.g., type, age, size) during all passes, and all scat collected. During subsequent passes, areas where fresh scat is found will prompt concentrated searches. After the second pass, concentrated searches will be conducted in all areas where recent sign is concentrated, unless a tortoise has been found in that area.

No burrows will be collapsed until the third pass, assuming that all tortoises probably have been relocated from the Project Area. (Fresh burrows used by other wildlife, including badgers or foxes, will not be collapsed until occupants have been removed via active or passive techniques approved by CDFG.) While clearance is planned to occur when ambient temperatures are safe for translocating tortoises, ambient temperatures may rise unexpectedly during the second pass such that a tortoise or other wildlife might be trapped in the open if its burrow has been excavated and collapsed during the search effort. To assist the identification of currently used burrows, all burrows will be inspected and assessed for occupation or recent use by tortoises during the first two passes, gated with small sticks along the entrance to detect future use, mapped and flagged. On the third pass, burrows will be completely excavated using standardized techniques approved by USFWS (2009a) and the Desert Tortoise Council (1994). During excavation, attention will be given to potential tortoise nests (see Nest Relocation, below).

Once all tortoises have been translocated from the Project Area, heavy equipment will be allowed to enter the site to conduct construction activities. However, the Project AB(s) will be continuously available during the construction period to remove any tortoises overlooked during the clearance surveys.

4.2.2 Translocation Release Areas and Designated Translocation Sites

Based on the multi-year surveys (Figure 3), it is highly likely that any tortoises found on the Project Area would be close to the Project Area borders, so few tortoises are likely to be moved >500 m (1650 ft) (Figure 4). Those moved <500 m will be relocated immediately outside the perimeter fence, onto suitable habitat on MSP land. Release points will be as close as possible to the tortoise's capture location, to keep tortoises within their home ranges. These locations cannot be specifically predicted, since surveys did not find any tortoises or burrows in the Project Area. However, based on habitat quality and observed tortoise sign (Figures 2 and 3), the release points most likely would occur along the southern, eastern and northeastern border of the Beta Site and the western border of the Alpha Site (Figure 4).

There is very little area inside the Project Area that is further than 500 m from the boundary (Figure 4). However, much of the Project boundary does not have suitable habitat into which to move a tortoise, even if it were <500 m from the border. Where tortoises must be moved >500 m, they will be translocated to individual pens in one of two designated Translocation Sites, each approximately 1.5 ha⁵. USFWS (2010b) has mandated that any tortoise moved >500 m must be quarantined onsite or offsite until the serology lab report is obtained in mid to late May. Onsite quarantine is not possible on the Project Area because there is not sufficient habitat onsite to support a tortoise. Furthermore, all areas inside the perimeter fence will be graded following tortoise clearance. Two translocation sites were chosen, one on each side of Harper Lake Road, to minimize post-translocation movements of tortoises across that road. All tortoises west of Harper Lake Road will be moved to the Translocation Site in Section 25, on land owned by Mojave Solar. All tortoises east of Harper Lake Road will be moved to the Translocation Site in Section 4, in the BLM DWMA and ACEC. Translocation to a DWMA or ACEC is preferred by CDFG, and BLM has agreed to move the few potential tortoises from MSP to BLM land (L. Encinas, pers. comm.). While the Translocation Sites constitute the release areas for tortoises moved >500 m, each Translocation Site plus surrounding area to 6.5 km (per USFWS 2010b) collectively would be considered a Translocation Area. This area meets the following critical requirements for an appropriate translocation site:

- Acclimation by translocatees would be facilitated by site familiarity, since tortoises currently live outside the Project Area, very likely all in the Translocation Area.
- The Translocation Sites are within the same population as the Project Area, so genetic, morphological and behavioral integrity would be maintained.
- The Translocation Sites are immediately adjacent to, in, or very near areas receiving moderate protection from BLM.
- The Translocation Area is part of a broad expanse of occupied tortoise habitat, sufficient to accommodate a few translocated tortoises. Tortoise populations are currently well below carrying capacity throughout their documented range, including the western Mojave Desert, due to a long-term drought and other factors (Karl 2004 and 2010b, McLuckie et al. 2006, Boarman et al. 2008). Based on the pattern of rangewide and local declines, it is likely that tortoise densities in the Project vicinity have similarly declined, so long-term carrying capacity would not be exceeded by the addition of a few tortoises. USFWS (2010b) has estimated that adult tortoise density in any Translocation Area should not exceed 130% of the current density in the recovery unit within which the translocation occurs. The most recent estimates from USFWS' range-wide sampling program in 2007,

⁵ The size of the translocation sites is dependent upon the number of tortoises moved there. As stated below, translocation pens are 0.25 ha each, separated by 100 m. So, two tortoises would require a 1.5 ha translocation site. It is highly unlikely that two or more tortoises would be translocated to either site.

2008, 2009 and 2010 are 3.1 to 4.7 tortoises/km² for the West Mojave Recovery Unit (USFWS 2009b, 2010d, e), within which the MSP is located. This would translate into a maximum allowable density in the Translocation Area (130% of 3.1-4.7) of approximately 5 tortoises/km², including both resident tortoises and translocated tortoises. During surveys of the Translocation Area to determine the health status of the resident population (see Section 4.2.4, Health Considerations, below), the current tortoise density in the Translocation Area will be determined. Assuming it's lower than 5 tortoises/km², then the number of tortoises that can be translocated into the Translocation Area can then be calculated. If the current Translocation Area density is already >5 tortoises/km², then USFWS will be contacted to determine the number of tortoises that can be translocated. However, this is unlikely to be a problem, because translocated tortoises would not actually be *added* to the population - they currently live in the Translocation Area.

The Translocation Site pens will be sufficiently large to support each tortoise pending disease testing results. Each will be a minimum of 165 x 165 ft (50 by 50 m), thereby providing adequate forage and sufficient habitat for a tortoise to find and/or construct adequate cover sites. Pens will be constructed using double-walled, 1 by 2 inch tortoise-proof fencing, installed as identified in Section 4.1, Project Area Fencing and Temporary Fencing, above. They will be separated by a minimum of 100 m so that tortoises will not be crowded once the fences are removed (if tortoises are seronegative) and tortoises fully released. Prior to Project Area clearance, pen design and an animal husbandry plan for penned tortoises will be approved by experienced personnel from an accredited American Zoological Association institution and approved by USFWS, BLM, and CDFG. While design will be pre-approved, pens will not be constructed until after that clearance pass on which tortoises are found, because it is highly unlikely that pens will be needed at all. All pens will be surveyed prior to and following their construction to ensure that no resident tortoises inhabit the pen.

4.2.3 Translocation Methods

All tortoises relocated or translocated from the Project Area will be measured, weighed, assessed for health, and affixed with a transmitter at the time of initial capture, and transported as described in detail in Section 3.0, Procedures Applicable to All Relocations and Translocations, above. Transmitted tortoises will be located daily the first week after transmitting and weekly thereafter until relocation or translocation.

All tortoises will be relocated or translocated at least one week before daily, midday temperatures are expected to exceed 95°F (35°C) air temperature (at 2 in) or 109°F (43°C) ground surface temperature, whichever is lower. This is expected to occur following the second clearance pass. No tortoise will be moved when air temperatures are expected to exceed 90°F (32°C) within three hours of release (USFWS 2010b).

All translocated tortoises will be rehydrated within 12 hours prior to release, via USFWS (2009a) methods.

All tortoises moved <500 m (1650 ft) will be placed in the shade of a shrub⁶ or at the entrance to a known burrow for that tortoise, and monitored as described in Section 4.2.5, Post-Release Tortoise Monitoring, below.

Any tortoise found further inside the Project Area than 500 m will be transmittered and monitored daily for one week to determine if it typically lives that far inside the Project Area or if the observed location was outside its core use area. If its burrows or core use areas are closer to the perimeter fence than 500 m, or outside the fence (i.e., the tortoise fencewalks), it will be relocated as identified above for tortoises moved < 500 m.

Any tortoise translocated >500 m will be placed in an individual quarantine pen in the relevant Translocation Site (see above), under a shrub or near an artificial burrow. Two artificial burrows, each at least 4 ft (1.2 m) long, will be constructed for each tortoise, using a gas-powered auger or shovel/plywood, per USFWS (2009a) guidance.

Moving tortoises from the Project Area to the Translocation Site following the second clearance pass in April will ensure that tortoises are moved well prior to lethal temperatures. Because blood samples must be collected on tortoises moved >500 m (see Section 4.2.4, Health Considerations, below) and blood sampling cannot occur prior to 15 May (USFWS 2010b)⁵, if tortoises were left on the Project Area until blood samples could be collected, then the spring translocation temperature window would be missed. If lab results are negative for exposure to *M. agassizii*, then the pen fence simply will be removed, thereby passively releasing the tortoise. This method ensures that tortoises are moved only once during the translocation process.

Juvenile tortoises, especially those under 4.4 inches (110 mm) in length, are highly subject to depredation by canids, badgers, and ravens, and require special consideration for successful translocation. Little is known about juvenile tortoise movements. Based on two studies of hatchling and/or juvenile tortoises, the mean distance translocatees moved in approximately one month was 521-723 ft (158-219 m; Hazard and Morafka 2002). For non-translocated hatchlings, the distance between nests and first-year hibernacula was 304-350 ft (92-106 m; TRW 1999b). Based on these values, as well as other data reported in these studies, a juvenile tortoise moved farther than 330 ft (100 m) may be outside its recent or familiar use area. For MSP clearance, if juvenile tortoises are moved within 330 ft of the capture location, where they may have site familiarity, they will be released under a shrub and monitored initially as described in Section 4.2.5, Post-Release Tortoise Monitoring, below. For distances >330 ft, they will be moved to the Translocation Site into a predator-proof enclosure, using 5-ft-tall “Non-Climb”, 2 by 4 inch vertical mesh fencing, buried at least 1 ft. and with avian netting over the top. The size of the enclosure would depend on the number of tortoises found, but would be a

⁶ In past relocation/translocation efforts, an artificial burrow has typically been constructed for tortoises. However, relocated and translocated tortoises do not use these burrows and it is anticipated that most tortoises removed from the Project Area will be relocated to areas where they have known burrows. Therefore, no artificial burrows will be constructed for relocated tortoises.

minimum of 20 ft in diameter, extending to 50 ft or more, as necessary, to accommodate more juvenile tortoises and/or a longer period of penning. (Morafka *et al.* 1997 successfully penned juvenile tortoises at the rate of 62-123 tortoises per acre (152-305 animals per hectare). Juvenile tortoises will remain in their pens until disease test results are received (see Section 4.2.4, Health Considerations, below). Seronegative and clinically healthy tortoises will be passively released via escape holes opened in the lower edge of the pen (e.g., Morafka *et al.* 1997). All pens will be monitored as identified in Section 4.2.5, Post-Release Tortoise Monitoring, below). Modifications to the design and process may occur in response to predator interest in the enclosure or juvenile tortoise behavior in the enclosure, incorporating new and relevant head-starting techniques used at Twenty-nine Palms Marine Corps Air Ground Combat Center.

This Plan recognizes that a tortoise may be found in the Project Area during site grading or routine fence monitoring, at ambient temperatures that are higher than the USFWS translocation guidelines. In such cases, the disposition of the tortoise will be determined by the AB, in consultation with USFWS and CDFG. In any case, the tortoise will be captured, secured in an individual, sterilized box and temporarily placed in a quiet, climate-controlled environment (e.g., the onsite Project office). Depending on temperatures and other factors, it is possible that the tortoise could be affixed with a transmitter and relocated outside the Project Area or translocated into the Translocation Site the same day, when temperatures subside (or the following morning for juvenile tortoises), and monitored to ensure its safety. Options are provided in Table 1. If the tortoise would likely be harmed or die, it will be held in captivity at a location approved by USFWS, CDFG and CEC, away from other tortoises, to be released into the Translocation Site during the next available window. Other options will also be investigated. The goal of the translocation is to keep the tortoise in the population, in order to promote recovery.

4.2.4 Health Considerations

Health assessments will be conducted on all tortoises relocated or translocated during Project Area clearance, by an experienced biologist approved by the USFWS. No tortoise with clinical signs of mycoplasmosis will be relocated. Schumacher *et al.* (1997) observed that clinical signs had a high statistical correlation with positive serology (i.e., exposure to *Mycoplasma agassizii*). A mucous nasal discharge was the clinical sign that was the most reliable predictor (93% of tortoises with a mucous nasal discharge were seropositive), although it could be caused by pathogens other than *M. agassizii*. Furthermore, a purulent nasal discharge was the only clinical sign that was relatively objective; other clinical signs were far more subjective, were potentially present for other reasons, and reduced the statistical predictability of positive serology. For the Project, a purulent nasal discharge will be the threshold to identify a diseased tortoise, unless USFWS determines that other clinical signs should be used for diagnosing a diseased tortoise.

Tortoises moved <500 m (1650 ft) will only have visual health assessments. Tortoises moved >500 m will also have blood samples collected. Blood samples (no more than 2

cc) will be collected via standardized techniques of brachial or subcarapacial venipuncture (University of Florida, Department of Pathobiology, no date) to test for the presence of antibodies to *M. agassizii* and other pathogens. Whole blood will be centrifuged and the plasma packaged on ice and sent overnight express freight to the University of Florida Mycoplasma Research Lab for analysis. USFWS (2010b) has determined that blood sampling on translocated tortoises cannot be collected until 15 May⁵. If this should change, then tortoises will be sampled as early as permitted. Only experienced, approved persons who have been previously permitted to conduct this work on desert tortoises will be permitted to collect the samples.

Desert tortoises relocated or translocated from the Project Area that have clinical signs of disease or are seropositive will be sent to the Desert Tortoise Conservation Center (DTCC) or other agency-approved facility where they will undergo further assessment, treatment, and/or necropsy. Mojave Solar will provide a flat fee of \$9,000 for each desert tortoise sent to the DTCC commensurate with the cost to provide housing, care, treatment, and other services for five years (\$3,000 for Year 1, \$1,500 for Years 2 to 5).

USFWS (2010b) and more recent communications (T. Engelhard, pers. comm. to A. Karl) have mandated that if a diseased or seropositive resident is within 1.5 km (0.9 mi) of a relocated tortoise or 6.5 km (4.1 mi) of a translocated tortoise, then the relocation site (or translocation site) must be moved. The rationale given is that relocated tortoises may move 1.5 km after relocation and translocated tortoises may move as much as 6.5 km. This rationale is highly unlikely to apply to MSP, since any tortoise that must be relocated or translocated from the Project Area is likely a transient; most would be moved only a few meters, still inside their home ranges. So, they would be unlikely to move the large distances identified above. Per USFWS (2010b) guidance, Mojave Solar will conduct a 100% coverage survey for all diseased or seropositive residents within 1.5 km of any release site for a relocated tortoise (Figure 4) and within 6.5 km of the translocation site to which a tortoise is translocated (Figure 5). However, recognizing the unusual, site-specific conditions for the Project, USFWS, CDFG, and BLM have agreed to consider alternatives for this measure based on the number and distance of tortoises actually moved.

Mojave Solar would conduct surveys for resident tortoises during the second clearance pass (assuming that tortoises have been observed inside the Project Area) based on locations of tortoises found inside the Project Area – these would determine release sites and if the Translocation Site is likely to be needed.

All resident tortoises within 1.5 km of a relocation site and 6.5 km of a translocation site will be processed (weighed, measured, described, photographed), marked with an epoxy number for future identification and their health assessed. If any tortoises from the Project Area are moved more than 500 m, then all resident tortoises within 6.5 km of the Translocation Site will be transmittered for follow-up blood sampling at the earliest date approved by USFWS, currently 15 May (USFWS 2010b). All transmittered residents will be located the first day following the transmitter attachment, every other day for two weeks to determine the tortoise's use area (for ease of future monitoring), and then

according to the USFWS (2010b) schedule. If a resident tortoise has clinical disease signs or is seropositive following lab testing, the relocation site that is within 1.5 km or the Translocation Site that is within 6.5 km will be shifted to be outside of those respective distances. If this cannot be accommodated, further coordination with the agencies will be needed.

4.2.5 Post-Release Tortoise Monitoring

All relocated or translocated tortoises will receive immediate post-release visual monitoring as described for Project Area Perimeter Fencing in Section 4.1.5, Post-Release Tortoise Monitoring, above. Additionally, each will be located via telemetry for the next two days during tortoise activity temperatures to ensure that no tortoise is fence-walking or otherwise compromised. All tortoises in quarantine pens will be monitored according to the approved husbandry plan. A minimum monitoring effort will include checking twice daily for the first two weeks, or until fence-walking (should it occur) ceases, whichever is longest. Following this, all tortoises sequestered in pens will be checked daily via telemetry until serology results are returned and tortoises can either be released or transferred to an approved facility. All pen fences, including juvenile pens, will be monitored at least once daily to ensure that they remain intact.

All relocated or translocated tortoises will become part of the five-year monitoring study, as described for Project Area Perimeter Fencing in Section 4.1.5, Post-Release Tortoise Monitoring, above.

4.2.6 Nest Relocation

Nest relocation and monitoring during Project Area clearance will follow the same procedures as outlined above for Project Area Perimeter Fencing in Section 4.1.6, Nest Relocation.

4.3 SCE Fiberoptics Construction, Construction Outside the Project Area, and Harper Lake Road

SCE's upgrades to their existing transmission line to accommodate telecommunications will be subject to all tortoise protection measures, including but not limited to pre-construction surveys, construction monitoring, and relocation, that are identical to those for construction of the perimeter fence in Section 4.1, Project Area Perimeter Fencing and Temporary Fencing, above, with the exception that no tortoises would be transmitted or included in a long-term monitoring program.

Although not anticipated, any other Project-related construction activities that occur in unfenced, native habitat will adhere to the same tortoise protection measures described for SCE telecommunications upgrades. Harper Lake Road will be the main access to the Project during both construction and operation. Tortoise exclusion fencing was

previously installed on sections of this road, but it is incomplete. According to BIO-7 (CEC 2010), during construction a BM⁷ will drive this road at least every three hours during the desert tortoise activity period (approximately 1 April to 1 November). Outside of the active period, a BM will monitor the road in advance of peak morning and evening traffic. If possible, tortoises will be allowed to move off the road of their own accord; follow-up monitoring will ensure that the tortoise will not re-enter the road. For tortoises that must be moved to protect them, they will be handled in accordance with the measures provided in Section 3.0 Procedures Applicable to All Relocations/Translocations, above. All tortoises will be placed in the deep shade of a large shrub with immediate follow-up monitoring as described for tortoises moved during Project Area fence construction (Section 4.1, Project Area Perimeter Fencing and Temporary Fencing, above).

4.4 Operations Phase

Tortoises observed during maintenance activities outside the Project Area fence or along the main access road by personnel leaving or entering the Project Site will not be disturbed or handled and will be allowed to move away of their own accord. Any maintenance or emergency/unexpected repairs outside the fence that require surface disturbance or heavy equipment will require the same protection measures described for Project Area fence construction in Section 4.1, Project Area Fencing and Temporary Fencing, above.

Because it is anticipated that the Project Area will be entirely devoid of vegetation following surface grading, (except for small, landscaped areas at the offices) there will be no areas where a tortoise could reside onsite. Therefore, any tortoise found during Project operations likely will have entered the Project Area through a gate or breach in the fence. It is likely, although not impossible, that any tortoise found during Project operations would not yet have constructed a burrow and would have entered the site only recently. Any such tortoise will be relocated, under supervision of the AB, to the nearest suitable, safe habitat outside the fence onto Project or BLM land adjacent to the Project. Because any tortoise found inside the Project Area is likely to be a transient, it is anticipated that the tortoise would seek a familiar burrow when released outside the Project Area. All tortoises will be placed in the deep shade of a large shrub and monitored as described for tortoises moved during Project Area fence construction (Section 4.1, Project Area Perimeter Fencing and Temporary Fencing, above). USFWS, CDFG, BLM, CEC, and DOE will be contacted the next business day or the following Monday if the tortoise is found on a weekend, and informed of the disposition when any desert tortoise is located within the solar field during operations.

In the event that surface temperatures are in excess of USFWS translocation temperatures, the tortoise will be secured in an individual, sterilized box and placed in a

⁷ Because this is a CEC Condition of Certification and may require handling of tortoises, all BMs conducting this activity must be approved for surveying and handling by the CEC, CDFG and BLM, as well as by the MSP DB.

quiet, climate-controlled environment (e.g., the onsite Project office). Under supervision of the AB, the tortoise will be released in the late afternoon/early evening of the same day, when ambient temperatures subside. Juvenile tortoises will be released in the early morning to minimize depredation. All boxed tortoises or tortoises affixed with transmitters will be monitored periodically during the day and following release, to ensure their safety, according to methods described for perimeter fencing in Section 4.1.5 Post-Release Tortoise Monitoring, above.

It would be highly unlikely for a tortoise to be discovered wintered in a burrow on the site. However, if such an inactive tortoise were found, it would be handled and removed from the site as specified for wintering tortoises in Section 4.1, Project Area Perimeter Fencing and Temporary Fencing, above.

4.5 Decommissioning and Reclamation Phase

During the Project decommissioning and reclamation phase, activities will take place both inside fenced areas and in unfenced native habitat. All techniques provided above for tortoise relocation and translocation during perimeter fence construction will apply to decommissioning activities outside fenced areas. Newer information will be incorporated, as appropriate, to optimize tortoise relocation.

4.6 Injured or Dead Tortoises

During construction or operations, any tortoise injured or killed will be reported by phone to USFWS, CDFG, BLM, DOE and CEC no later than noon on the first business day following the discovery of the injured/killed tortoise; a follow-up written report will be e-mailed or faxed within 48 hours. Prior to initiation of relocation/translocation, the DB will contact CDFG for the name of an approved veterinarian or wildlife rehabilitation clinic. If a tortoise is injured, the DB will immediately attempt to contact CDFG and USFWS for direction. However, if those agencies cannot be reached, the DB will evaluate the level of injury and the need for veterinary care. If the DB concludes that veterinary care is necessary to aid or humanely euthanize the animal, then the tortoise will be taken immediately to one of the approved facilities at the expense of the Project owner. If a tortoise is killed, it will be salvaged for necropsy.

5.0 Reporting

BIO-11 of the final CEC license (CEC 2010) requires that the Designated Biologist provide a report to the CEC within 30 days of completing Project Area clearance. This report will document how each of the desert tortoise mitigation measures in this Plan have been satisfied. At a minimum, the report will also document survey results, the capture and release locations of all desert tortoises found (including maps and narrative), weather during all handling, release and monitoring occasions, immediate post-release monitoring data, individual tortoise data and photographs, and other relevant data (see Section 3.1, Data Gathered on Relocated and Translocated Tortoises, above). These

reports will be submitted to USFWS, CDFG, CEC, BLM⁸ and DOE; the AB in charge of relocation/translocation will approve these reports prior to submittal. Monthly and annual reports that document similar data, collected during all monitoring activities, will be prepared as part of the Designated Biologist's duties and submitted to the CEC, USFWS, CDFG, BLM and DOE.

For the post-relocation monitoring study, an annual report will be submitted to the USFWS, CDFG, CEC, BLM, CEC and DOE to document activities and analyze preliminary results. A comprehensive report will be conducted at the end of the monitoring program. Interim contact will be made (e.g., via e-mail or letter reports) if important findings could assist the resource agencies in desert tortoise recovery.

6.0 Funding

Mojave Solar will provide adequate funds to complete all work as described.

7.0 Literature Cited

Barrett, S.L. 1990. Home range and habitat of the desert tortoise (*Xerobates agassizii*) in the Picacho Mountains of Arizona. *Herpetologica* 46:202-206.

Blackford, A. USFWS, Ventura Field Office. 21 May 2010. Personal communication to A. Karl

---, W.B. Kristan, III, and A.P. Woodman. 2008. Neither here nor there: current status of Sonoran desert tortoise populations in Arizona. Paper presented at the 2008 Desert Tortoise Council Symposium, Las Vegas, NV.

Brown, M.B. 2010. E-mail on blood sampling for ELISA testing and seasonal effects on immune systems to Kimberleigh Field, USFWS. 6 October 2010.

Burge, B.L. 1977. Movements and behavior of the desert tortoise, *Gopherus agassizi*. M.S. Thesis, Univ. of Nevada, Las Vegas. 225 pp.

California Department of Fish and Game. 2010. Comments from Eric Weiss and Tonya Moore on the Abengoa Draft Translocation Plan. E-mail to Heather Blair, Aspen Environmental.

California Energy Commission. 2010. Commission decision on the Abengoa Mojave Solar Project. Docket No.09-AFC-5. 583 pp.

⁸ All reports relative to tortoises on BLM lands will be provided to BLM, as well as USFWS, CDFG, CEC, and DOE.

- Desert Tortoise Council, 1994 (rev. 1999). Guidelines for handling desert tortoises during construction projects. E.L. LaRue, Jr. (ed.) Wrightwood, CA.
- Duda, J.J., A.J. Krzysik, and J.E. Freilich. 1999. Effects of drought on desert tortoise movement and activity. *Jour. Wildlife Mgmt.* 63(4):1181-1192.
- Encinas, L. 17 November 2010. E-mail to C. Hammel-Smith, A. Karl, and A. Blackford.
- Englehard, T. USFWS, Carlsbad Fish and Wildlife Office. 24 September 2010. E-mail to A. Karl.
- Hazard, L.C. and D.J. Morafka. 2002. Comparative dispersion of neonate and headstarted juvenile desert tortoises (*Gopherus agassizii*): a preliminary assessment of age effects. *Chelonian Conserv. Biol.* 4(2):406-409.
- Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game, Nongame-Heritage Program. 155 pp.
- Karl, A.E. 1989. Investigations of the desert tortoise at the California Department of Health Services' proposed low-level radioactive waste facility site in Ward Valley, California. Unpub. rept. submitted to US Ecology and Ecological Research Services. 116 pp.
- . 1992. Annual report to the U.S. Fish and Wildlife Service for Permit No. PRT-746058. 12 pp.
- . 2004. Drought: acute effects and impacts to recovery of the desert tortoise. Paper presented at the 2004 Desert Tortoise Council Symposium, Las Vegas, NV.
- . 2010a. Mojave Solar Project desert tortoise clearances and relocation/translocation plan. Submitted to Mojave Solar, LLC. CEC Docket No. 09-AFC-5. 29 pp.
- . 2010b. Ridgecrest Solar Power Project. Analysis of population and species impacts to the desert tortoise, due to the siting of this project in its current location. Docketed 29 April 2010. 19 pp.
- and Resource Design Technology, Inc. 2007 Mesquite Regional Landfill. Initial desert tortoise clearance-October 2005. Submitted to the Los Angeles County Sanitation Districts, Whittier, CA. 28 pp plus attachments.
- Marlow, R. W., K. von Seckendorff Hoff, and P. Brussard. 1997. Management of wild tortoise populations is complicated by escape or release of captives. Pp. 479-480 *in* J. van Abbema (ed.), *Proceedings: Conservation, Restoration, and Management*

of Tortoises and Turtles – an International Conference. Joint publ. of the New York Turtle and Tortoise Society and the WCS Turtle Recovery Program.

- McLuckie, A.M., M.R.M. Bennion, R.A. Fridell, and R. Radant. Status of the desert tortoise in the Red Cliffs Desert Reserve. Paper presented at the 2006 Desert Tortoise Council Symposium, Las Vegas, NV.
- Morafka, D.J., K.H. Berry, and E.K. Spangenberg. 1997. Predator-proof field enclosures for enhancing hatching success and survivorship of juvenile tortoises: a critical evaluation. Pp. 147-165 *in* the New York Turtle and Tortoise Society, Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles – an International Conference.
- Mojave Solar, LLC. 2009. Mojave Solar Project Application for Certification. Submitted to the California Energy Commission, Sacramento, CA. August 31, 2009.
- Ninyo & Moore, 2006. Ninyo & Moore Geotechnical and Environmental Sciences Consultants (Ninyo & Moore), 2006. Geotechnical Reconnaissance Harper Lake Dairy Park, Lockhart, California. Prepared for Metcalf & Eddy. July 7.
- Nussear, K.E. 2004. Mechanistic investigation of the distributional limits of the desert tortoise, *Gopherus agassizi*. *Ph.D. Diss.* University of Nevada, Reno.
- O'Connor, M. P., L. C. Zimmerman, D. E. Ruby, S. J. Bulova, and J. R. Spotila. 1994. Home range size and movements by desert tortoises, *Gopherus agassizii*, in the eastern Mojave Desert. *Herp. Monogr.* 8:60-71.
- Schumacher, I.M., M.B. Brown, E.R. Jacobson, B.R. Collins, and P.A. Klein. Detection of antibodies to a pathogenic *Mycoplasma* in desert tortoises (*Gopherus agassizii*) with upper respiratory tract disease. *J. Clin. Microbiol.* 31(6):1454-1460.
- TRW Environmental Safety Systems, Inc. 1999a. Movement patterns of desert tortoises at Yucca Mountain. Unpubl. rept. to U.S. Department of Energy, Yucca Mountain Site Characterization Office, North Las Vegas, NV. Document No. B00000000-01717-5705-00049.
- . 1999b. Cover use and movement patterns of hatchling desert tortoises at Yucca Mountain, Nevada. Unpubl. rept. to U.S. Department of Energy, Yucca Mountain Site Characterization Office, North Las Vegas, NV. Document No. B00000000-01717-5705-00073. 11 pp.
- United States Department of Energy. 2010. Biological Assessment: Mojave Solar Project. Prepared by AECOM, San Diego, CA, for Mojave Solar, LLC. 110pp.

United States Fish and Wildlife Service. 1992. Field survey protocol for any federal action that may occur within the range of the desert tortoise. Ventura, California Field Office.

- . 2009a. Desert tortoise field manual. Available online at (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt/dt_fieldmanual)
- . 2009b. Range-wide monitoring of the Mojave Population of the desert tortoise: 2007 annual report. Desert Tortoise Recovery Office, Reno, NV.
- . 2010a. Comments on the draft Mojave Solar Project Desert Tortoise Clearance and Relocation/Translocation Plan from Ashleigh Blackford, USFWS, Ventura Field Office. 26 April 2010.
- . 2010b. Translocation of desert tortoises (Mojave Population) from project sites: plan development guidance. August 2010. Unpub. document. 11 pp.
- . 2010c. . Preparing for any action that may occur within the range of the Mojave desert tortoise (*Gopherus agassizii*). 2010 Field Season. Available at: http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/. 18 pp.
- . 2010d. Draft range-wide monitoring of the Mojave Population of the desert tortoise: 2008 and 2009 reporting. Desert Tortoise Recovery Office, Reno, NV. 67 pp.
- . 2010e. Draft range-wide monitoring of the Mojave Population of the desert tortoise: 2010 annual report. Desert Tortoise Recovery Office, Reno, NV. 51 pp.

University of Florida, Department of Pathobiology. No date. Serologic test for tortoise exposure to *Mycoplasma*. Unpub. doc. 5 pp.

Zimmerman, L.C., M.P. O'Connor, S.J. Bulova, J.R. Spotila, S. J. Kemp, and C.J. Salice. 1994. Thermal ecology of desert tortoises in the eastern Mojave Desert: seasonal patterns of operative and body temperatures, and microhabitat utilization. *Herp. Monogr.* 8:45-59.

APPENDIX 1. Sample Desert Tortoise Data Form

LIVE TORTOISE DATA FORM
HYUNDAI MOTOR AMERICA TEST TRACK PROJECT
CALIFORNIA CITY, KERN COUNTY, CALIFORNIA

OBSERVER Eli Beraske
 PROCESSOR Karl
 DATE 10-18-03
 TIME (pst) FOUND ~1600 on 10/17/03
 START PROC. 0837 found / 1003 - retr. from burrow
 FINISH PROC. 149 10/19
 T_a 22.7°C T_b 23.9°C WIND 0-1 mph T_{scn} 22.9
 PPT/CC 90% cirrostratus

TORTOISE # H-08
 TRANSMITTER: TYPE NOL # 87159
 DATA LOGGER # NONE

BEHAVIOR (check one, elaborate as necessary):
 IN BURROW, FACE IN end (~167cm)
 IN BURROW, FACE OUT _____
 ENTERING BURROW _____
 RUNWAY, EXITING _____
 BASKING _____
 TRAVELLING when found on 10/17
 UNDER SHRUB IN SHADE _____
 UNDER SHRUB, FACE INTO STEM _____
 OTHER T-P out

CAPTURE LOCATION:
 GENERAL LOCATION NE 1/4 of S16
 UTM: E 0404614 N 3878932
 RELEASE LOCATION:
 GENERAL LOCATION _____
 UTM: E _____ N _____

GENDER ♀
 If unknown, check the following indicators and elaborate:
 TAIL LENGTH _____ PYGAL _____
 ABDOMINALS _____
 ANALS _____ WIDTH OF FOREFOOT _____
 CHIN GLANDS _____
 MASS (g): INITIAL 3790 FINAL (w/transmitter) 3815
 VOID: URINE? _____ SCAT _____ VISCOSITY _____
 COLOR _____ PPT _____
 TOTAL MASS OF EXCRETA (g) _____

DISEASE INDICATIONS (elaborate as necessary; grade severity of abnormal conditions: (1) mild; (2) moderate; (3) severe)
 BEAK/NARES (answer all):
 GREEN NO DRY ✓ OCCLUDED NO
 NASAL EXUDATE NO
 SEROUS _____
 NON-SEROUS (severity, color, quality) _____

MEASUREMENTS (mm):
 MCL 280 PLN 247.5 HT 110
 WIDTH M7/8 (seam) 214 GW 222 @ PM 6
 WIDTH M6 (mid) if GW is not M5, M6, or M7 X

CAKED DIRT ON BEAK/FORELIMBS NO
 EXUDATE ON FORELIMBS NO
 BREATHING (ck all that apply; describe/grade abn. cond):
 CLEAR ✓ WHISTLING _____
 OBSTRUCTED _____

SHELL WEAR CLASS 6
 SUPER- or SUB-NUMERY MARGINALS? NO, but extra vert
 NUMBER OF GROWTH RINGS Car + coat
 GENERAL TORTOISE SHAPE (check one):

EYES (ck all that apply; describe/grade abn. cond.):
 CLEAR, BRIGHT ✓ MOIST LIDS NO
 SWOLLEN OR SUNKEN NO
 DISCHARGE NO
 CONJUNCTIVITIS NO
 CHIN GLANDS DRAINING? NO

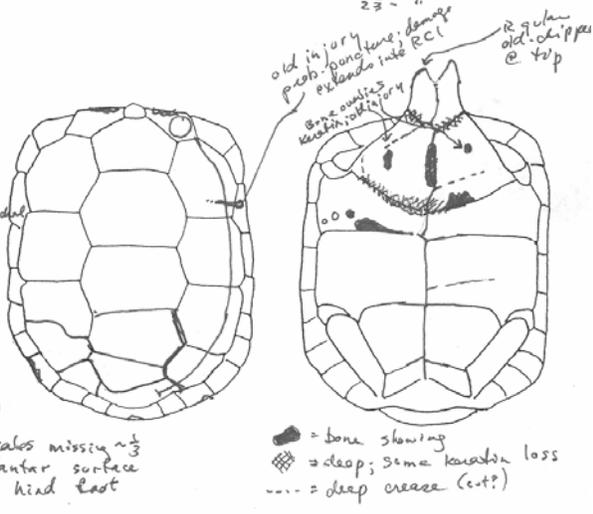
PHOTO: ROLL 1 FRAMES 17-19
 17 - Pleation L.H.
 18 - Ant. pleation 19 - foot
 20 - c w/ transmitter
 22 - " "
 23 - " "

ORAL CAVITY (ck all that apply; describe/grade abn. cond):
 COLOR pale pink
 LESIONS NO
 ODOR NO

ATTITUDE (check all that apply)
 STRONG ✓ ACTIVE _____
 QUIET, WITHDRAWN ✓
 RELAXED _____ LETHARGIC, WEAK _____

SHELL (ck all that apply; describe/grade abn. cond.):
 NORMAL _____ ABNORMALLY SCALEY ✓ Scales along midline to ant. 1, 2, nodal
 LESIONS TO BONE BLOODY loss of keratin in small "divots" - may be lesions. Bone shows along humeral + pectoral

EXTERNAL PARASITES (answer all that apply) # _____ TYPE _____ LOCATION _____



these seams are deep; appear to have some keratin loss. Ant. margins 1+2 + nodal also seem abnormally scaly (1-2)
 Both front + leg surfaces have experienced some loss of scales, esp. L. Prob. chewing.

Scales missing at plantar surface L hind foot

APPENDIX 2. Animal Husbandry Plan

FIGURES



Source: Thomas Guide, 2007

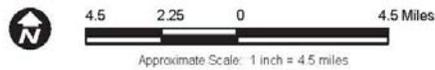


Figure 1
Location of the Mojave Solar Project
Near Hinkley, San Bernardino County, California

Final MSP Desert Tortoise Translocation Plan / January 2011
 P:\2008\08080191 Harper Lake A\envgoa AFC\4.0 Documents_References\4.7 Draft Documents\Figures\2009 Botanical Survey Ltr Rpt corona-bennettj 7/23/09

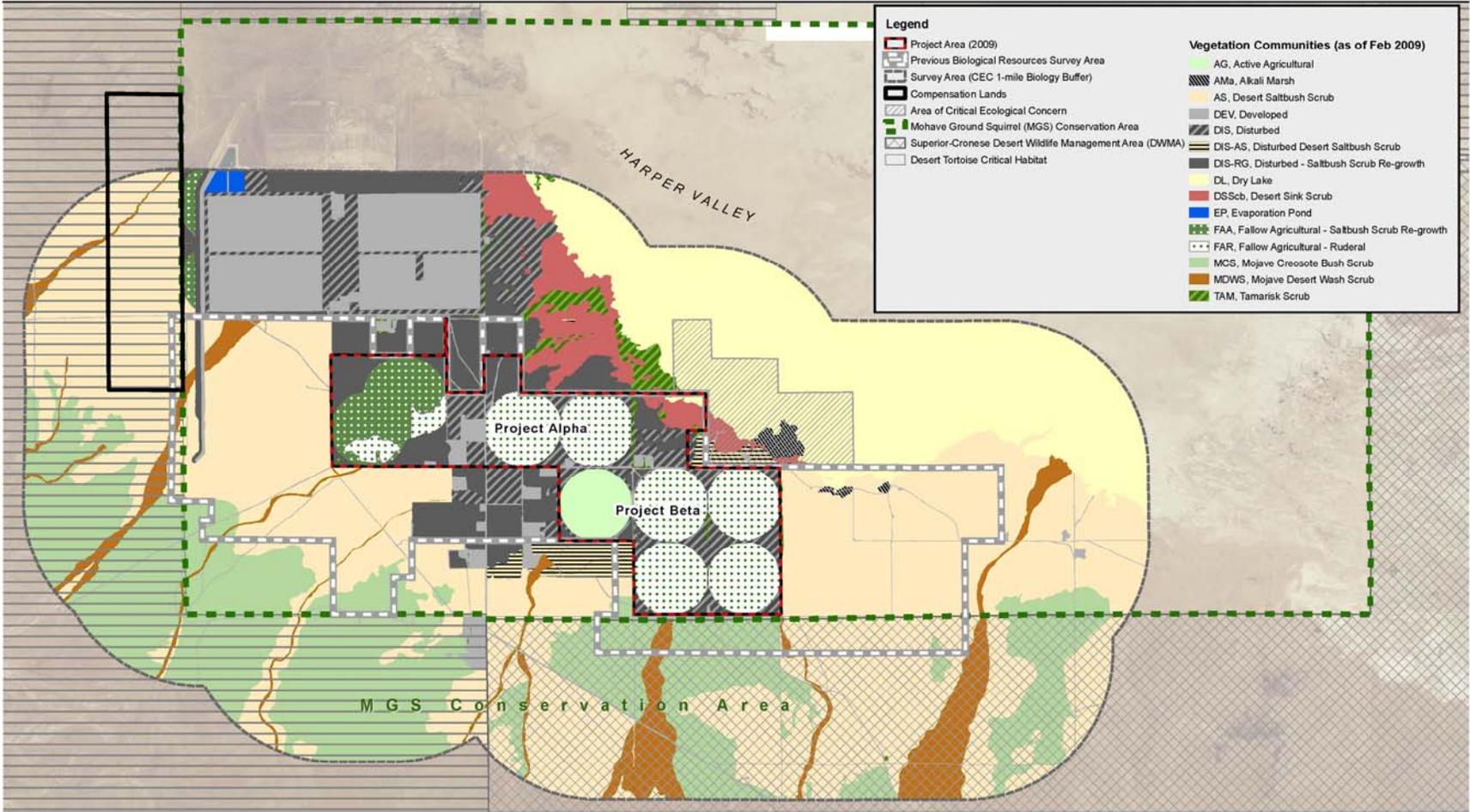
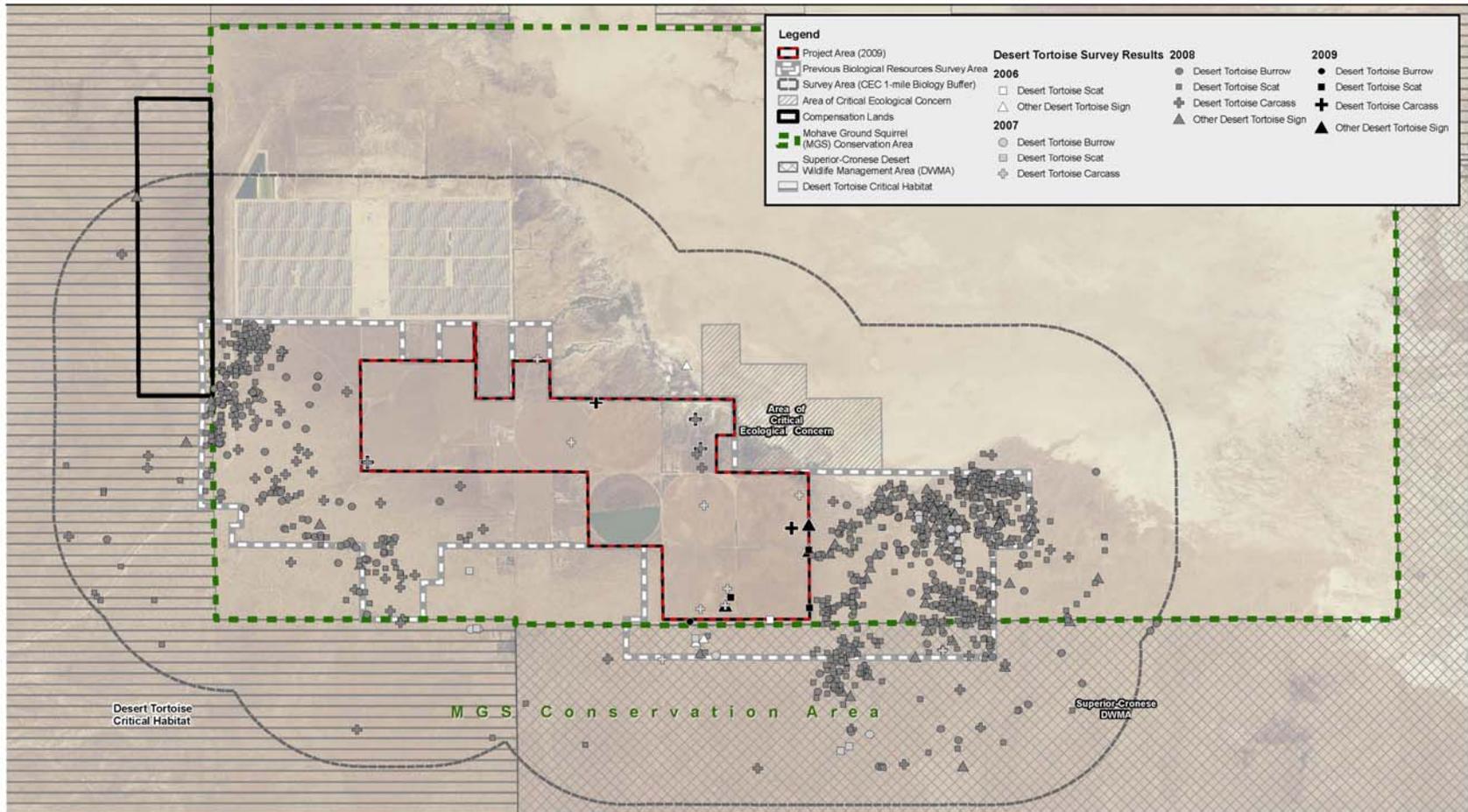


Figure 2
Mojave Solar Project Vegetation Cover and Special Management Areas

Source: NAIP 2005; USFWS 2006; BLM 2009; Mojave Solar, LLC 2009; San Bernardino County 2009
 Scale: 1 = 42,000; 1 inch = 3,500 feet

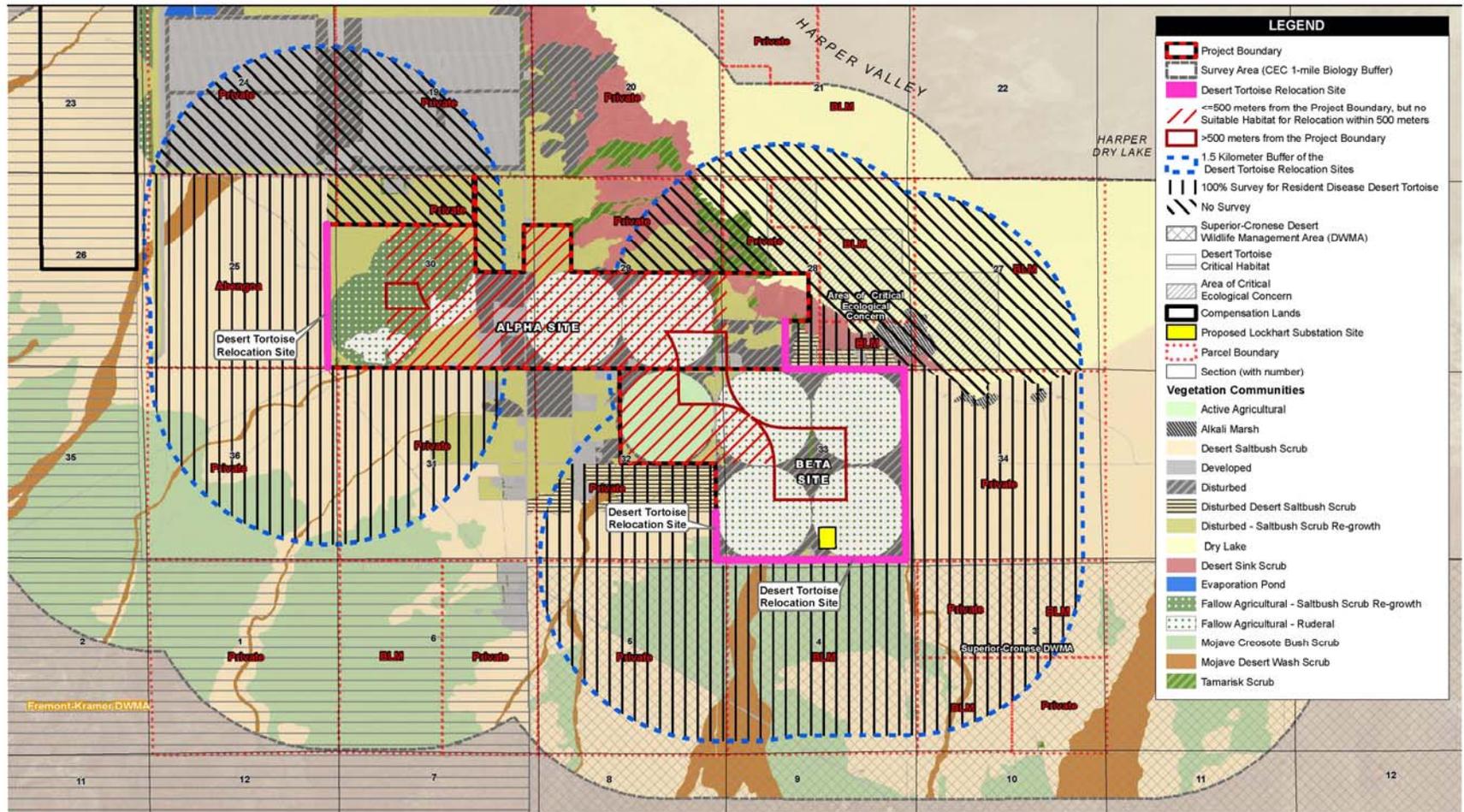
Final MSP Desert Tortoise Translocation Plan /January 2011
 Path: P:\0005\08090191 Harper Lake Abongos APC\6.0 GIS\6.2 Project Directory\6.2.3 Layout\Compliance\DETO\reg_cvr.mxd, 01/17/11, BogonkaM



Source: NAIP 2005; USFWS 2006; Mojave Solar, LLC 2009
 3,500 1,750 0 3,500 Feet
 Scale: 1" = 42,000'; 1 inch = 3,500 feet

Final MSP Desert Tortoise Translocation Plan /January 2011
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Figure 3
 Desert Tortoise Sign



Source: NAIP 2005, USFWS 2006, BLM 2009, Mojave Solar, LLC 2009, San Bernardino County 2009, BLM 2010

2,700 1,350 0 2,700 Feet

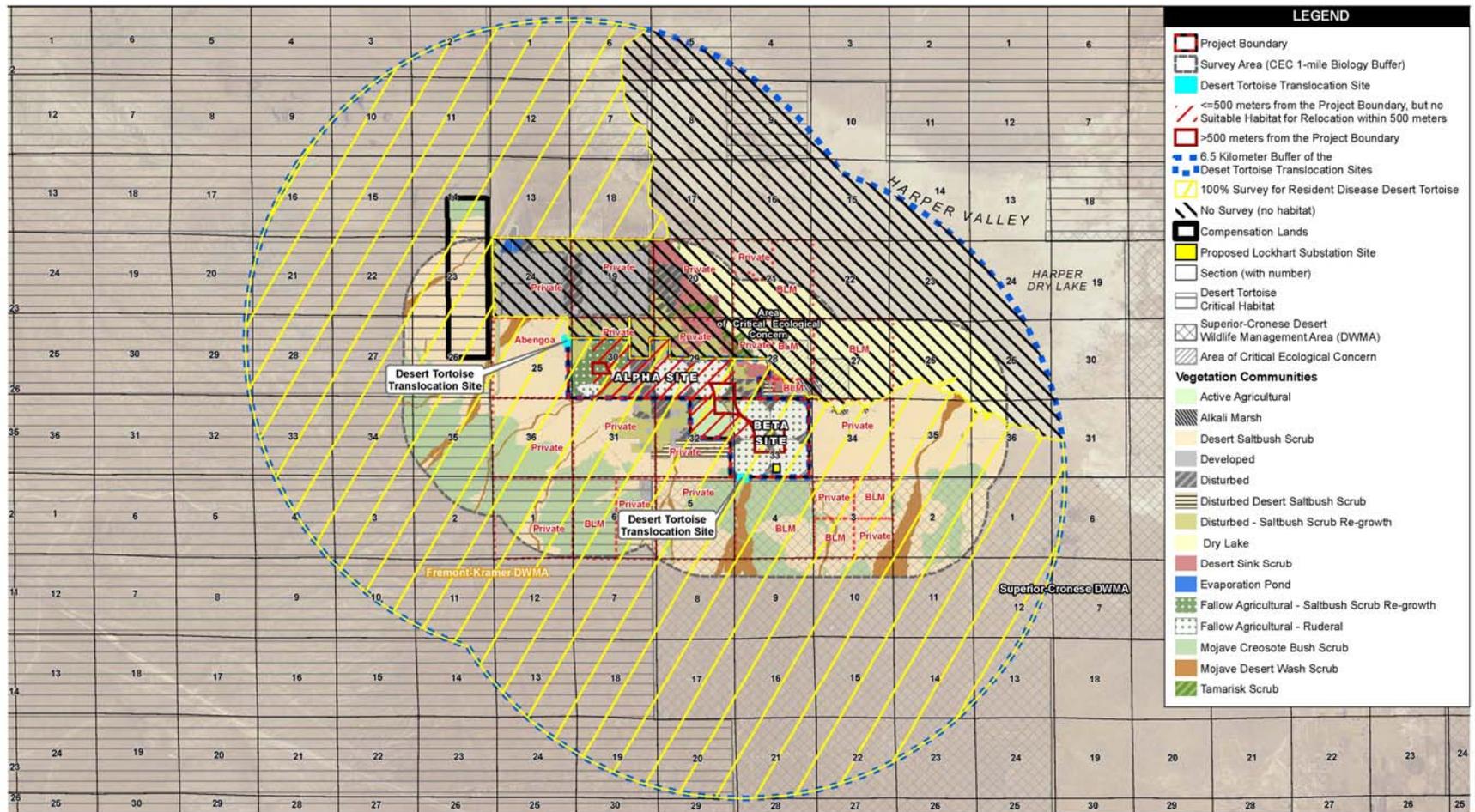


Scale: 1" = 32,400'; 1 inch = 2,700 feet

Figure 4
Relocation Sites and Surveys for Diseased Resident Tortoises

Final MSP Desert Tortoise Translocation Plan /January 2011

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Source: NAIP 2005, USFWS 2006, BLM 2009, Mojave Solar, LLC 2009, San Bernardino County 2009, BLM 2010



Final MSP Desert Tortoise Translocation Plan /January 2011

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Figure 5
Translocation Sites and Surveys for Diseased Resident Tortoises

APPENDIX E

BURROWING OWL MITIGATION PLAN

DRAFT
MOJAVE SOLAR PROJECT
BURROWING OWL
MONITORING AND MITIGATION PLAN

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March 2011

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1.0 INTRODUCTION

1.1 PURPOSE OF THE PLAN

This Burrowing Owl Mitigation Plan (Plan) describes the actions to be taken to protect resident and/or nesting western burrowing owls (*Athene cunicularia hypugea*; WBO) known to occur within and in the vicinity of the proposed Abengoa Mojave Solar Project (MSP or Project). The Plan specifies a passive relocation approach that, when implemented, will facilitate avoidance, minimization, and the offset of impacts to WBO relocated from the Project Disturbance Area. The primary purpose of this Plan is to provide a strategy that will facilitate the protection of WBO, a California Species of Special Concern, during MSP construction. This Plan fulfills the Project mitigation measures identified in the Project Application for Certification (AFC) (MSLLC 2009) and Condition of Certification (COC) BIO-13 (Appendix A) in the Final Commission Decision (CEC 2010), requiring passive relocation and/or non-disturbance buffers (area in which no activity will occur) of WBO.

Specific objectives for WBO protection addressed by this Plan are as follows:

- Provide avoidance measures to protect WBOs during Project implementation, including avoidance of active nests during construction activities, if necessary.
- Describe the strategy and methodology for passive relocation of all WBOs within the Project area to a nearby area that provides suitable nesting and foraging habitat.
- Minimize impacts to WBOs within the passive relocation site.
- Assess the success of the WBO passive relocation effort through monitoring.
- Implement mitigation/compensation measures for WBO.

These objectives will be met through the following actions:

- Detecting the locations of WBO-occupied and WBO-suitable burrows prior to the nesting season (February 1 through August 31) for Project Disturbance Areas in which construction will occur plus a 160-foot construction buffer of that area with the purpose of passive relocation if WBO are detected;

-
- Detecting WBO-occupied and WBO-suitable burrows during the nesting season during desert tortoise (*Gopherus agassizii*; DT) clearance surveys or nesting bird surveys in the Project Disturbance Area plus a 250-foot construction buffer;
 - Identifying suitable artificial burrow location sites in coordination with the California Department of Fish and Game (CDFG) and California Energy Commission (CEC) Compliance Project Manager (CPM) beyond 160 feet of the overall Project Disturbance Area within the compensation lands;
 - Passively relocating, banding, and monitoring WBO from identified WBO burrows within the Project Disturbance Areas during the nonnesting season (September 1 through January 31) or when it has been determined by a qualified biologist that the WBO have not yet laid eggs or that the juveniles are foraging independently of the adults;
 - Monitoring all areas cleared of WBO during preconstruction surveys for the period prior to ground disturbance;
 - Monitoring all WBO-occupied burrows in the 160-foot construction buffer for nonbreeding pairs (i.e., during the nonnesting season) and 250-foot construction buffer for breeding pairs (i.e., during the nesting season or if a pair has been determined to be breeding outside the nesting season);
 - If burrows within the Project area are found to be occupied during the nesting season and the WBO are nesting or have dependent juveniles (when passive relocation is not possible), the burrows will be surrounded at a radius of 330 feet (100 meters [m]) with non-disturbance fencing (or other delineation) and activities will be limited in the area to ensure that nests will not be abandoned;
 - Maintenance, monitoring, reporting, and managing WBO on the relocation property; and
 - Monitoring of mitigation lands for 2 years (two spring and two winter surveys per year).

1.2 PROJECT BACKGROUND

The Abengoa Mojave Solar Project is a solar electric-generating facility to be located on approximately 1,765 acres in unincorporated San Bernardino County, California, approximately 26 miles northwest of Barstow. Mojave Solar LLC, a subsidiary of Abengoa Solar Inc., (Abengoa or ASI) will own and operate the MSP. ASI filed an AFC with CEC for the Project on August 10, 2009. CEC issued a Final Permit Decision adopting the Presiding Member's Proposed Decision (PMPD) to recommend licensing the Project on September 8, 2010.

The Project site is accessed by Harper Lake Road, which is located approximately 20 miles west of Barstow along the Highway 58 corridor. The Project site is approximately 6 miles north of where Harper Lake Road intersects Highway 58. See the regional map (Figure 1).

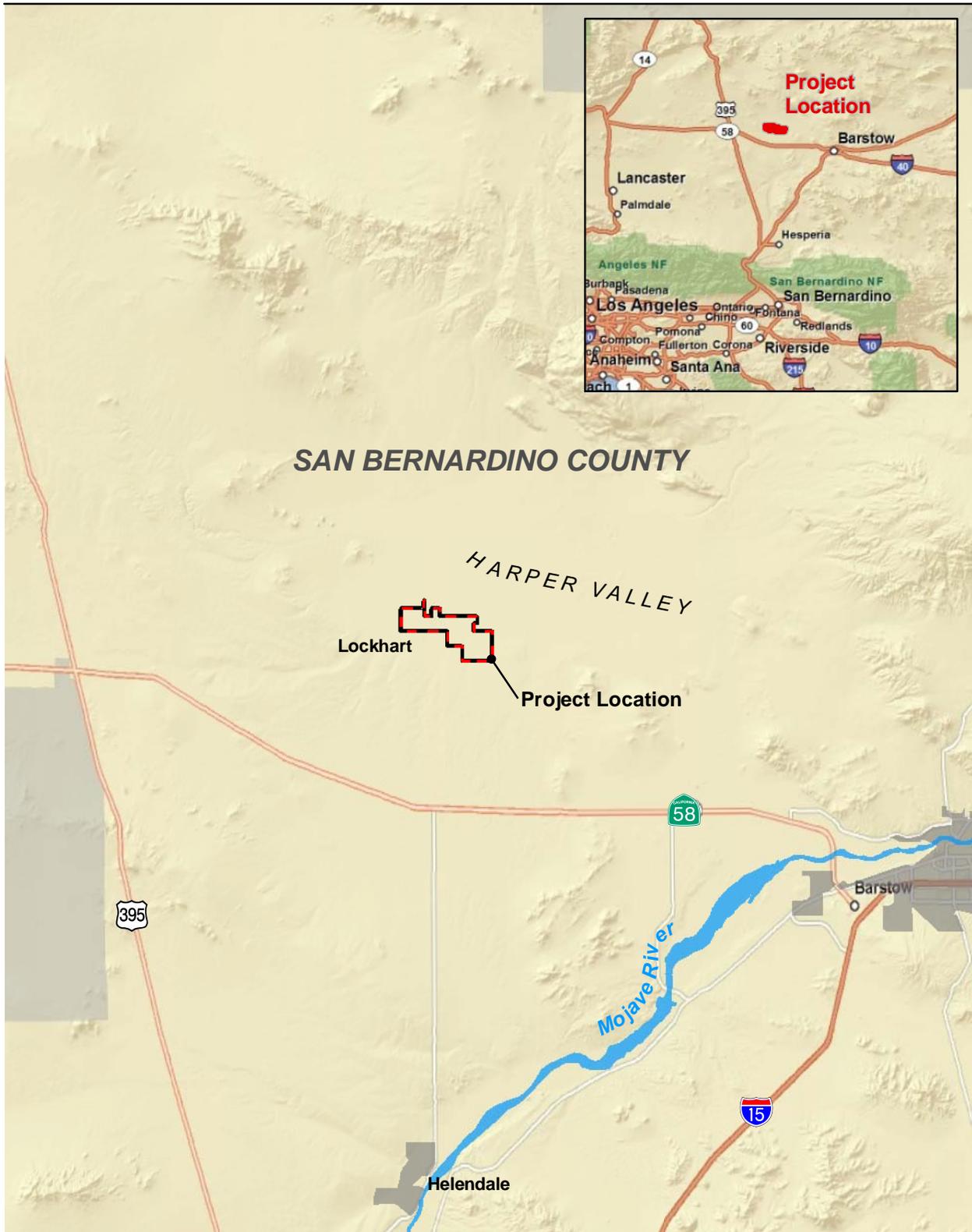
The Project site is composed of private property historically used as the Lockhart Ranch complex. The site once served as an agricultural and cattle center and included farming activities that used flood and pivot system irrigation.

The Project will implement well-established parabolic trough technology to heat a heat transfer fluid (HTF). The heated HTF will generate steam in solar steam generators (SSGs), and the steam will then be expanded through a steam turbine generator (STG) to produce electrical power.

The Project will have a combined nominal electrical output of 250 megawatts (MW) from twin, independently operable solar fields (Alpha and Beta), each feeding a 125-MW power island. The Alpha site is approximately 950 acres, and the Beta site is approximately 815 acres. Approximately 70% of the total Project area will consist of solar fields. Approximately 3% of the site will be occupied by the power blocks, with the remaining 27% consisting of drainage improvements, evaporation ponds, a substation, and other common elements. The electrical output from the Alpha and Beta sites will join at an onsite transmission line interconnection substation to form one full-output transmission interconnection. The power generated by the Project will be transmitted to Southern California Edison's (SCE's) transmission grid through SCE's existing 230-kilovolt (kV) Kramer-Cool Water #1 transmission line. The entire site perimeter will be fenced.

The sun will provide 100% of the power supplied to the Project through solar-thermal collectors; no supplementary fossil-based energy source (e.g., natural gas) is proposed for electrical power production. However, each power island will have a natural-gas-fired auxiliary boiler to provide equipment freeze protection and HTF freeze protection. The auxiliary boiler will supply steam to HTF heat exchangers as needed during offline hours to keep the HTF in a liquid state when ambient temperatures fall below its freezing point of 54 degrees Fahrenheit (°F). Each power island will also have a diesel-engine-driven firewater pump for fire protection and a diesel-engine-driven backup generator for power plant essentials.

The Project will use wet cooling towers for power plant cooling; the Project owner owns adjudicated water rights for this purpose. Water for cooling tower makeup, process water makeup, and other industrial uses such as Solar Collector Array (SCA) washing will be supplied



Source: Mojave Solar, LLC 2010; ESRI 2010

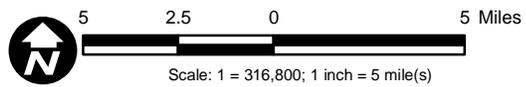


Figure 1
Regional Map

from onsite groundwater wells drawing from these water rights and will also be used to supply potable water. A packaged water treatment system will be used to treat the water to meet potable standards, since the source is brackish.

A sanitary septic system and onsite leach field will be used to dispose of sanitary wastewater at each power island. Project cooling water blowdown will be piped to lined, onsite evaporation ponds for each plant area. The ponds will be sized to retain all solids generated during the life of the plant. However, if required for maintenance, dewatered residues from the ponds could be sent to an appropriate offsite landfill as non-hazardous waste.

Natural gas for the Project's ancillary purposes, such as the auxiliary boilers, space heating, and the like, will be supplied by a Southwest Gas Corporation (SGC) owned pipeline that runs to the Project boundary near the Alpha power island. No offsite pipeline facilities are proposed as a part of this Project.

Construction of the MSP facility, from site preparation and grading to commercial operation, is expected to take approximately 2-1/2 years. Commercial service is expected by winter of 2013. The MSP has an expected operating life of 30 to 40 years. Whenever the facility is closed, whether temporarily or permanently, the closure procedures outlined in the CEC Decision will ensure compliance with applicable laws, ordinances, regulations, and standards (LORS).

Once the Project is completed and the site is developed, the site would be devoid of vegetation and likely would no longer provide suitable habitat for WBO.

AECOM was contracted by ASI to perform environmental services to support the review process being undertaken by CEC. WBO is protected under the Federal Migratory Bird Treaty Act (MBTA) and is designated as a Species of Special Concern by CDFG.

1.3 ROLES AND RESPONSIBILITIES

ASI is ultimately responsible for implementing this WBO Plan. It is anticipated that ASI contractors and other parties responsible for implementing components of this WBO Plan will include the following:

EPC Contractor(s): The engineering, procurement, and construction (EPC) contractor construction manager will have ultimate oversight of the construction contractor to ensure compliance with the provisions of this WBO Plan. Contractual language will be included in

construction documents and ongoing maintenance contracts to verify that all contractors, subcontractors, vendors, maintenance personnel, and other parties performing either construction or ongoing maintenance or repairs at the site abide by and implement the provisions of this WBO Plan as it relates to their work. Implementing the construction provisions of this WBO Plan will be a part of construction contracts. Landscape contractors and other specialists will implement specific provisions of this WBO Plan either as subcontractors to the general construction contractor or through independent contracts with ASI.

California Energy Commission: CEC provided guidelines and COCs for the Project. Staff, acting through the CPM, will determine whether the WBO Plan and activities performed under the WBO Plan have been satisfied.

Designated Biologist: ASI will assign a Designated Biologist (DB) to the Project (COC BIO-1) and alternate DB(s) with the same qualifications as the DB. The DB will be present during any site mobilization, ground disturbance, construction, grading, operation, and closure activities. Biological Monitor(s) (BM[s]) may be approved by the DB and assist in conducting the duties of the DB, but the DB is the contact for the Project owner and the CPM. The DB is responsible for the following (COC BIO-2):

- Provide advisement to the Construction Operations Manager regarding COCs for biological resources;
- Consultation on the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP);
- Consult, supervise, and conduct mitigation, monitoring, and other biological resources compliance efforts, especially in biologically sensitive areas or areas requiring avoidance;
- Halt construction activities if a violation of federal or state environmental laws or the agreements and conditions made by the Applicant and the CPM/regulatory agencies or if an unauthorized adverse impact to biological resources were about to occur;
- Ensure that all sensitive biological areas are clearly marked and inspected;
- Check areas where animals may become trapped due to construction activities at the start and end of each day, prevent entrapment through the use of covers and escape routes, and monitor areas with high vehicle activity to check for animals in harms' way;
- Report any non-compliance instances with the COCs to the CPM;
- Respond to inquiries from the CPM regarding biological resource issues;

-
- Maintain written records of the above tasks and those required in the BRMIMP and provide summaries in the Monthly Compliance Report; and
 - Train BMs as appropriate, including ensuring familiarity with the BRMIMP, the Worker Environmental Awareness Program (WEAP), and all permits.

A resume of the proposed DB, along with the required three references and contact information, will be submitted to the CEC CPM for approval in consultation with CDFG and the 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 3 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 1 year of field experience with biological resources found in or near the Project area; and
- Have the background and training to be approved as an "Authorized Biologist," which is a designation that describes biologists who have been approved by USFWS to handle and move DT.

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

Biological Monitor (BM): ASI and the DB will designate BM(s) to provide oversight of activities such as WBO surveys, relocation, and protection measures. The BMs, along with the DB, will be responsible for ensuring compliance with the provisions of this WBO Plan. The DB and BM will be responsible for detecting WBO within and adjacent to construction areas and the BM will reinforce the worker education provided by the DB regarding protective measures. The BM will be contracted by ASI and must be knowledgeable about the Project, WBO avoidance and protection obligations, and the habitat use of WBO in the vicinity of the Project area.

1.4 2006–2009 SURVEY RESULTS

A reconnaissance-level survey was conducted in 2006 and protocol surveys were conducted in spring 2007 and 2008 by AECOM biologists to determine WBO presence/absence, distribution,

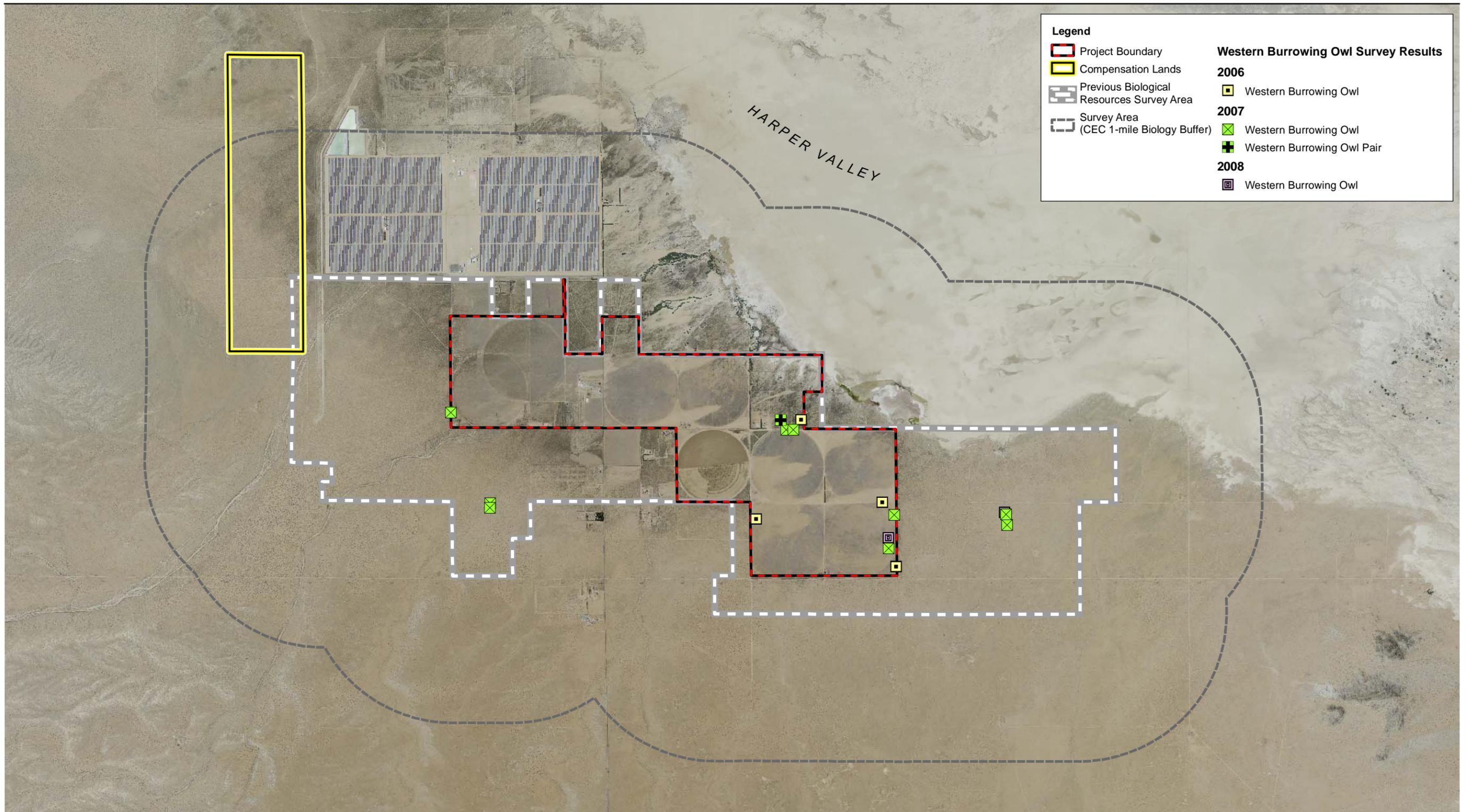
abundance, and breeding status within a broad expanse of land under the control of the Applicant. The ultimate Proposed Project was sited within a portion of this land to avoid and minimize Project effects to biological resources (EDAW 2007, 2009). Figure 2 displays the locations of WBOs observed during the 2006 reconnaissance survey and the 2007 and 2008 protocol surveys. Surveys for WBO were conducted per California Burrowing Owl Consortium (CBOC) protocol (CBOC 1993, CDFG 1995), and were focused to determine the presence or absence, distribution, abundance, and breeding status of the species. Surveys were conducted within the lands under control of the Applicant, plus a 500-foot buffer per the CBOC protocol, with the addition of a 1-mile buffer as directed by CEC where two CEC-recommended transect surveys 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.

Information collected on WBO was included in the biological resources analysis in the Project AFC, which quantifies potential impacts on WBO and identifies appropriate avoidance, minimization, and mitigation measures. A detailed description of the survey methodology and results can be found in the Project AFC, Volume 3 (MSLLC 2009).

Most of the lands under control of the Applicant, as well as the adjacent buffer, are considered suitable WBO habitat. The survey area consists primarily of previously disturbed vegetation. Within the Proposed Project site, the dominant vegetation community is fallow agricultural fields, with lesser patches of disturbed areas, active agriculture, saltbush scrub regrowth, and minor pockets of vegetation associated with the Harper Dry Lake margin (Figure 3).

During 2006 reconnaissance surveys, four WBO individuals were detected along the borders of the Project area. Protocol surveys in 2007 found a pair of WBO plus five individual WBOs within the Project area. Additionally, four individual WBOs were found outside the Project area in the 1-mile survey buffer. During WBO surveys in 2008, a single WBO was observed within the Project area, and one WBO was observed within the 1-mile survey buffer. A pair of WBO that had been observed in the Project area during 2007 surveys was not observed in the 2008 surveys. A domestic dog was observed within this area, so the loss of the pair may have been due to dog predation, or the owls may have simply moved. The number of WBO observations, year, and proximity to the Project area are detailed in Table 1.

Burrows where WBOs were either observed or where their sign was documented were all located in flat, sparsely vegetated areas. The low density of WBO in the Project area is consistent with the documented low general numbers of the species in the surrounding region.



Legend

- Project Boundary
- Compensation Lands
- Previous Biological Resources Survey Area
- Survey Area (CEC 1-mile Biology Buffer)

Western Burrowing Owl Survey Results

2006

- Western Burrowing Owl

2007

- Western Burrowing Owl
- + Western Burrowing Owl Pair

2008

- Western Burrowing Owl

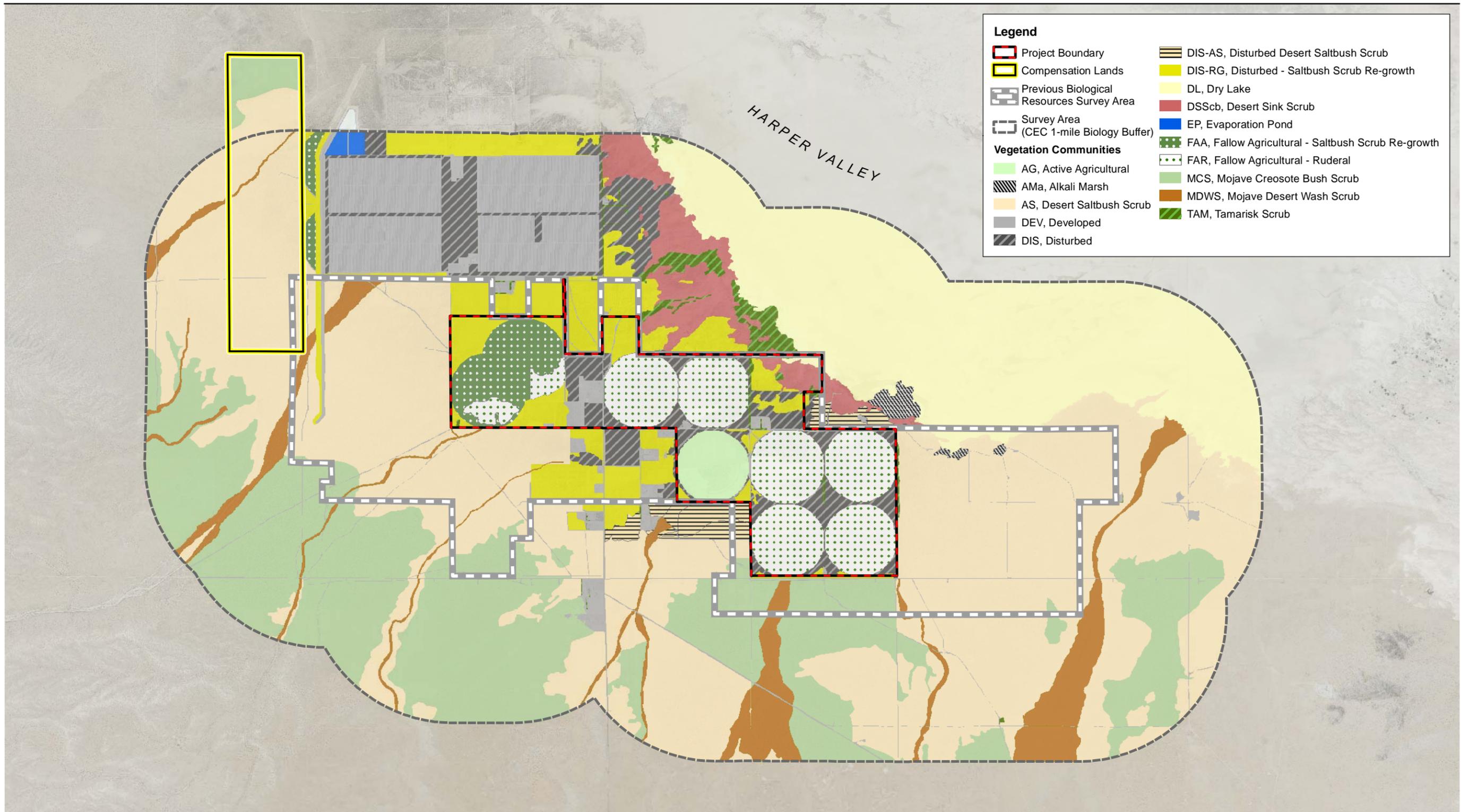
Source: NAIP 2009; Mojave Solar, LLC 2009; AECOM 2009

3,500 1,750 0 3,500 Feet

Scale: 1 = 42,000; 1 inch = 3,500 feet

Figure 2
Burrowing Owl Observations

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Source: NAIP 2009; Mojave Solar, LLC 2009; AECOM 2009

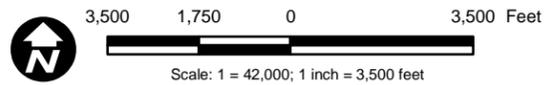


Figure 3
Vegetation Communities

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Table 1
2006–2008 WBO Protocol Survey Results and Other WBO Occurrences

Distinct Observation(s)	Year	Area/Proximity of Project Area
4 individuals	2006	Within eastern section of Project area
4 individuals	2007	Within 1-mile survey buffer east and south of Project area
5 individuals plus 1 pair	2007	One WBO within western section, all other WBO within eastern section of Project area
1 individual	2008	Within 1-mile survey buffer east of Project area
1 individual	2008	Within eastern section of Project area

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2.0 PASSIVE RELOCATION METHODS

This section discusses the specific procedures and methods to be used to achieve the purposes and objectives of this Plan, including preactivity surveys, preconstruction surveys, artificial burrow installation, and passive relocation protocols. Preactivity surveys are conducted outside the nesting season. This is generally the time when passive relocation can occur, but passive relocation can also occur after it has been determined by a qualified biologist that the young have fledged from the nest. Preconstruction surveys are conducted 30 days prior to the initiation of ground-disturbing activities. Preactivity surveys can function as preconstruction surveys if they are conducted no more than 30 days prior to construction. Artificial burrows are to be constructed to provide burrow opportunities for WBOs that have been passively relocated and to provide burrow opportunities for WBOs within the area.

2.1 NONNESTING SEASON PRACTIVITY SURVEY

Nonnesting season preactivity surveys as described in this section are required to identify locations of WBO within the Project area and a 160-foot survey buffer for nonbreeding pairs. These surveys will be conducted during the nonnesting season (September 1 through January 31) prior to planned activity in all Project Disturbance Areas. They will involve a burrow survey (CBOC Phase II) to update the protocol surveys conducted in 2007 and 2008 and to identify the locations of any newly established WBO-occupied or WBO-suitable burrows. Focused surveys will be conducted, as necessary, at dawn or dusk according to CBOC guidelines to determine presence or absence of WBO at suitable burrows and/or where sign is observed. This survey will be conducted in the areas where construction will occur during that year plus a 160-foot construction buffer of that area. The survey will be conducted by qualified wildlife biologists. Specific requirements of this protocol stipulate that walking survey transects will be spaced to allow 100% visual coverage of the ground surface; distance between transect center lines will be no more than 98 feet and will be reduced to account for differences in terrain, vegetation density, and ground surface visibility. This survey will be conducted by walking through suitable habitat over the Project Disturbance Area and within 160 feet of the Project Disturbance Area. This 160-foot nonnesting season buffer zone is included to account for adjacent burrows and foraging habitat outside the Project Disturbance Area and impacts from factors such as noise and vibration due to heavy equipment, which could impact resources outside the Project Disturbance Area (CBOC 1993). The results of the nonnesting season preactivity survey will be included as an addendum to the final version of the Burrowing Owl Monitoring and Mitigation Plan (detailing the number of WBO observed within the Project area), which will be submitted within 10 days of completion of the WBO preconstruction surveys to the CPM, CDFG, and USFWS.

This survey serves three purposes:

1. Identify any WBO that will be color-leg-banded with aircraft aluminum bands in accordance with the guidance provided by the U.S. Geological Survey (USGS) bird banding lab to monitor relocation success. This process is discussed in Section 2.2.
2. Identify all burrows from which WBO will need to be passively relocated or excluded from future use during the allowable relocation window prior to the start of the breeding season. Passive relocation of WBO is discussed in Section 2.2.
3. Determine the number of WBOs occupying the Project Disturbance Areas scheduled for activity to determine the number of artificial burrows needed per CBOC guidelines (five artificial burrows will be installed for each identified WBO burrow in the Project area that would be destroyed). Artificial burrow installation and site selection are discussed in Section 2.3.
4. Since the preactivity and preconstruction surveys follow the same protocol, both types of surveys will collect data that will be sufficient to determine the presence or absence of owls, and whether or not those owls may require passive relocation. Therefore, if Project disturbance is scheduled to start within 30 days of this preactivity survey, this survey could serve as the preconstruction survey. Preconstruction survey protocols and scheduling considerations are discussed in Section 2.4.

2.2 PASSIVE RELOCATION

Passive relocation is considered the preferred option to trapping (CBOC 1993). During the nonbreeding season (September 1 through January 31), owls to be relocated will be color-banded with aircraft aluminum bands in accordance with USGS bird banding lab guidelines (located at <http://www.pwrc.usgs.gov/BBL/manual/manual.htm>) by approved and permitted biologists. The purpose of the banding is to be able to monitor the WBOs that have been passively relocated. According to BIO-13 (Appendix A) of the CEC's COCs, WBOs will be given a minimum of 3 weeks to become familiar with the new artificial burrows to be constructed within compensatory habitat outside of the Project area, after which eviction of owls within the Project area will begin. During this three week period, if the banded birds are found within the compensatory habitat, they will be observed to determine if they are using the artificial burrows. If it can be determined that suitable habitat (including natural burrows) is present within 600 meters of occupied WBO burrows (but outside the Project Disturbance Area), then a 3-week waiting period should not be necessary. The WBOs would already be familiar with the available natural burrows within the area, and the constructed artificial burrows are not likely to be visited unless the WBOs to be

relocated are in close proximity to the compensatory habitat. In such an instance, the DB will coordinate with CDFG, USFWS, and the CPM to review the availability of potential habitat nearby for passively relocated owls, as well as the relocation strategy and timing as it relates to construction of artificial burrows.

After the completion of the preactivity survey, a report detailing the findings of the survey effort will be provided to the CPM, CDFG, and USFWS. If WBOs are detected and there is a need for passive relocation, specific efforts relating to passive relocation for each WBO pair will be described in detail in this report. The purpose of this document is to provide the proposed passive relocation strategy to the CPM, CDFG, and USFWS so that they can provide approvals.

The success of the passive relocation effort will be determined through the monitoring effort, as proposed in Section 3, below.

One-way doors as described by Trulio (1995) and Clark and Plumpton (2005) will be used to facilitate passive relocation of WBO. If relocation occurs near the breeding season, focused monitoring of the WBOs will 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 the use of one-way doors.

Excluded burrows will be monitored daily for 3 days to confirm no additional WBO use them before excavating burrows. If possible, the activity of banded WBOs will be monitored by the DB. After burrows are confirmed to no longer be in use, the burrows will be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe or burlap bag will be inserted into the tunnels during excavation to maintain an escape route for any WBOs inside the burrow.

WBO must be excluded from WBO-occupied and WBO-suitable burrows identified during the nonnesting preactivity survey prior to the following nesting season (February 1 through August 31) and any Project disturbance. WBO passive relocation efforts will be led by the DB and staffed by qualified wildlife biologists. WBO will be excluded from identified burrows by installing one-way doors (e.g., 4-inch-diameter corrugated irrigation pipe with gravity-closing see-through door) in each burrow entrance.

The sequence of events to exclude WBO from the Project Disturbance Area is described below:

-
1. Any WBOs that will be relocated will be color banded according to guidelines in COC BIO-13 by an authorized bird banding biologist.
 2. Install one-way doors in all suitably sized burrows (greater than or equal to 4 inches in diameter) actively used by WBO and suitable burrows in the immediate vicinity of the occupied burrow(s). Suitable burrows without recent WBO sign will be addressed first. One-way doors will be installed in burrows actively used by WBO after installation occurs on all other suitable burrows in the immediate vicinity to avoid multiple evictions.
 3. One-way doors will be installed during the afternoon, with care taken not to flush any WBO from the Project Disturbance Area during one-way door installation. If any WBO are detected leaving the Project Disturbance Area in response to one-way door installation, installation activity will cease until the activity no longer poses a potential harassment threat (all detected WBO have voluntarily left the vicinity). In the event a burrow is larger than the diameter of the one-way door, that burrow will be remotely investigated with a fiber-optic scope camera to ensure an animal larger than the one-way door is not occupying the burrow. If not inspected, berms used to hold the one-way door in place may trap larger wildlife. Any burrows that are large enough for species such as desert kit fox or American badger would have already been surveyed for those species using wildlife camera and/or tracking medium to determine absence of these species, per BIO-14.
 4. For known occupied burrows, WBO will be observed at dusk (i.e., beginning 1 hour before evening civil twilight and ending at twilight) to document their departure from the Project Disturbance Area. This may require more than one observer to account for the location of all WBO. All observers will remain 250 feet from the one-way doors under surveillance so their presence does not alter WBO behavior.
 5. One-way doors will be installed in the burrows that WBO have been recently using after WBO have departed the area at dusk. One-way doors installed in known occupied burrows will be installed at not greater than a 45 degree angle from the ground to ensure WBO are able to depart.
 6. On the 7 days following one-way door installation, the exclusion area will be observed beginning at dawn (i.e., no later than morning civil twilight) until at least 1 hour after sunrise the following morning, and WBO presence or absence will be recorded in the exclusion area and their reaction to the presence of one-way doors documented.
 7. On the third morning following one-way door installation, using a fiber-optic scope camera, the recently used burrows identified in steps 2 and 4 above will be scoped. Suitable burrows without recent WBO sign (step 2) will be scoped to ensure that no other sensitive species are currently occupying burrows. Burrows known to be recently

occupied by WBO (step 4) will be scoped to ensure all WBO have vacated the burrow. Upon confirmation that the burrow is unoccupied by WBO, desert kit fox, American badger, or DT, the burrows will be excavated with hand tools using flexible pipe to allow wildlife to escape, and refilled to prevent reoccupation by WBO or other sensitive species.

8. The Project Disturbance Area and a buffer area (160 feet in nonnesting season [September 1 to January 31] and 250 feet in nesting season [February 1 to August 31]) will be monitored for WBO presence, including sign, for seven mornings (beginning at morning civil twilight) after the passive relocation effort is complete to ensure that other resident wildlife do not reexcavate burrows and WBO do not reoccupy those burrows.

The results of the passive relocation effort will be included in a report to the CPM, CDFG, and USFWS. This information will also be included in the Project's Annual Compliance Report.

While it is stated in BIO-13 that this plan will identify the optimal time to concurrently relocated DT and WBO, it is extremely unlikely that both species can be relocated at the same time based on the requirements for relocation for each species. According to the Desert Tortoise Clearance and Relocation/Translocation Plan for this project (Karl 2011), DTs will be relocated immediately after observation if ambient air temperatures do not exceed 95°C. Since DT clearance surveys will occur in April and May, if relocations were to occur they would likely occur during this period or during the installation of DT fencing in March. WBOs should not be passively relocated during March/April/May as it is likely that they will be breeding. If DTs are to be translocated (moved greater than 500 meters) they must be quarantined in individual pens until a serology lab report can be obtained in mid to late May and will be translocated at that time. This also precludes the possibility of relocating DT and WBO at the same time, as WBO are likely to be nesting in May. If both WBO and DT were occupying the same burrow the DT would need to be relocated when ambient air temperatures are below 95°C but when the DT is not brumating. The WBO would need to be passively relocated when WBO have not begun egg laying or when the juveniles are able to survive independent of the adults.

2.3 ARTIFICIAL BURROW AND RELOCATION SITE

In the event that WBO are observed within the Project area during nonnesting season surveys, artificial WBO burrows will be installed at a ratio of 5:1 to replace each identified WBO burrow in the Project area that is destroyed during passive relocation. These burrows will be installed in WBO suitable habitat within the compensation lands identified in Figures 2 and 3. The specific location of each burrow enhancement site or artificial burrow will be determined after WBO surveys of the compensation lands identify suitable locations for placement of artificial burrows

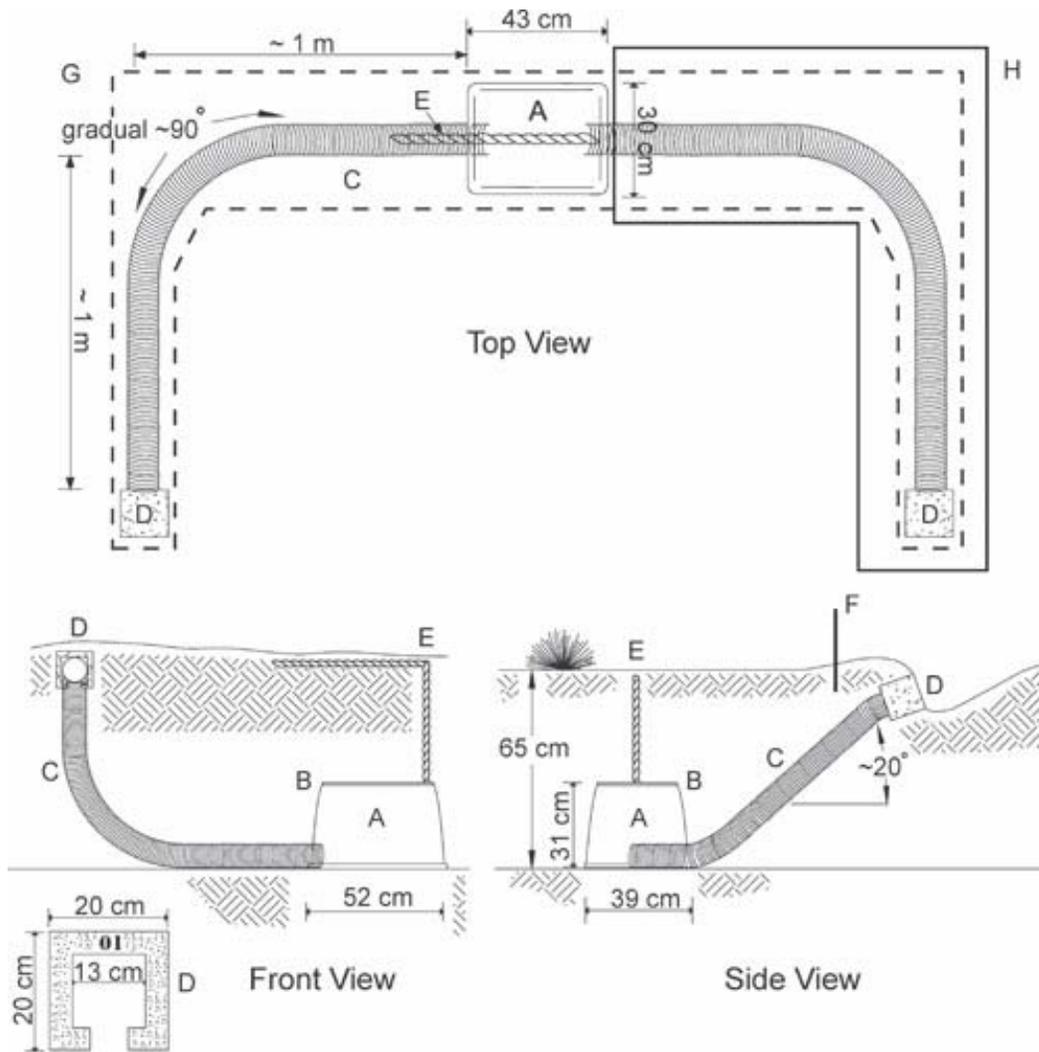
and establish a baseline for WBO use in the compensation lands. WBO surveys of the compensation lands will be conducted concurrently with surveys of the Project area prior to the WBO nesting season and prior to ground disturbance or heavy equipment staging only if WBO are detected within the Project area.

Artificial burrows will 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. Figures 4 and 5 depict examples of artificial burrows that will be installed within the compensation lands. Two different WBO artificial burrow designs are provided for flexibility based on habitat, vegetation, and topographical characteristics within the compensation lands. One design (Figure 4) depicts an artificial burrow that may be installed in a hillside or other location where topographical relief provides suitable habitat for WBO. The second design (Figure 5) depicts an artificial burrow with a mima-mound component that may be more suitable in flat terrain, but with vegetation. The elevated mound on top of the burrow allows WBO to have suitable visual coverage from predators. The CPM and DB will decide the final locations of the artificial burrows and approve the specific design of artificial burrow to be used.

Prior to ground disturbance at the artificial burrow installation site, surveys for other sensitive species (e.g., DT, MGS, existing WBO colonies, sensitive plants) may be required to verify that the construction of artificial burrows at the relocation site will not adversely impact those species. Installation of artificial burrows will be conducted in a manner to minimize impacts to DT and Mohave ground squirrel habitat.

Artificial burrow installation will be led by the DB and staffed by qualified wildlife biologists. Summaries of the identified areas will be submitted to and approved by CDFG, USFWS, and the CEC CPM prior to the initiation of passive relocation efforts. A description of activities at the artificial burrow and relocation site will be included in the addendum to the final Burrowing Owl Monitoring and Mitigation Plan.

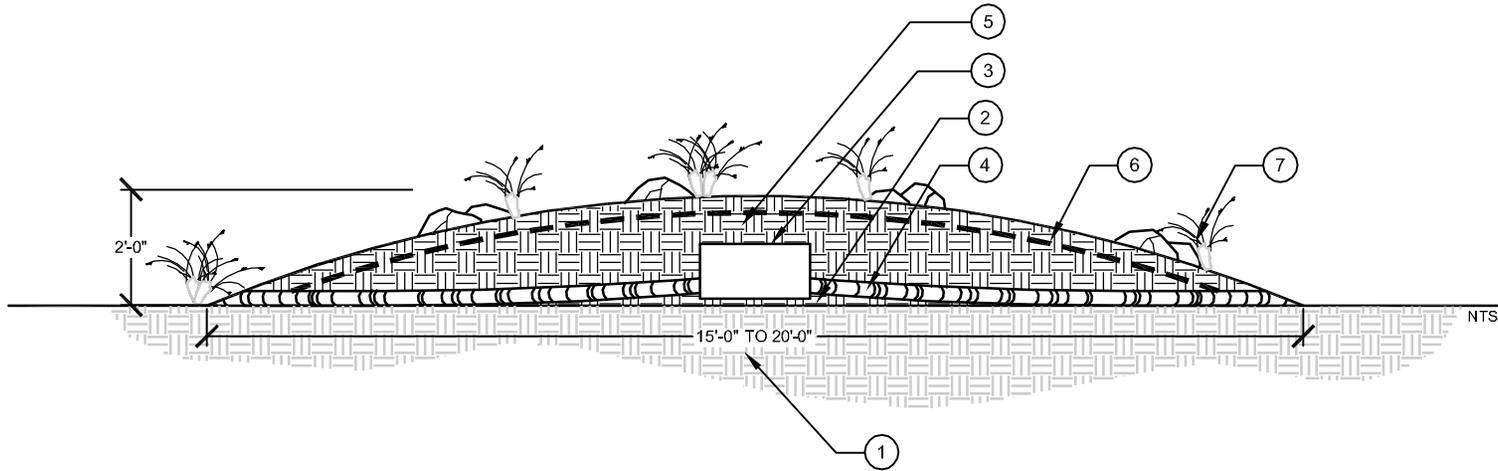
In addition, arrangements will be made for repairs to be completed for any damage to artificial burrows observed during spring and winter visits. Surveys of the artificial burrows will be conducted two times in the spring and two times in the winter following eviction. The second survey within a season will be conducted within 30 days of the first survey. Surveys will continue for 2 years after installation of artificial burrows to encompass a total of four spring and four winter surveys. Monitoring information will be included in the Project's Annual Compliance Report.



- A - Plastic irrigation valve box, 48 cm long x 35 cm wide x 27 cm high (inside dimensions)
- B - Removable lid
- C - Ca. 2 m of 10-cm diameter perforated flexible plastic pipe
- D - 20 x 20 x 15 cm hollow concrete block
- E - Plastic rope or chain marking location of nest chamber on ground surface
- F - 0.5 m perch post (optional)
- G - Excavation footprint for installation - - -
- H - Optional second entrance

Not to Scale

Figure 4
Artificial Burrowing Owl Burrow Design A



LEGEND

- | | | | |
|---|--|---|---|
| ① | NATIVE SOIL HORIZONS (TOPSOIL & CLAY PAN) | ⑤ | MOUND OF SOIL (APPROXIMATELY 20 - 25 CUBIC YARDS) |
| ② | 2" - 3" ADDITIONAL TOPSOIL UNDER IRRIGATION BOX | ⑥ | GEO-MESH COVERING MOUND TO DETER PREDATION APPROXIMATELY 4" - 6" BELOW TOPSOIL HORIZON OF MOUND SMALL HOLES CUT IN MESH TO ACCOMMODATE PLANT MATERIAL |
| ③ | PLASTIC IRRIGATION VALVE BOX APPROXIMATELY 2'x1.5'x1' | ⑦ | LANDSCAPING CONSISTING OF LOW GROWING PLANTS AND ROCKS |
| ④ | CORRUGATED PLASTIC PIPE (6" DIAMETER) ABOVE CLAY PAN TO PREVENT FLOODING | | |

Not to Scale

**Figure 5
 Artificial Burrowing Owl Burrow Design B**

2.4 PRECONSTRUCTION SURVEYS

Since the preactivity and preconstruction surveys follow the same protocol, both types of surveys will collect data that will be sufficient to determine the presence or absence of owls, and whether or not those owls may require passive relocation. Therefore, preactivity surveys and associated passive relocation activities meet the requirements of a preconstruction survey for any ground-disturbing activities occurring within 30 days following completion of passive relocation activities. However, if activities do not commence within 30 days following a preactivity survey, a preconstruction WBO survey is required, per BIO-13, in the Project Disturbance Area. This is necessary because it is possible for fossorial mammals to enter the Project Disturbance Area and establish burrows in the areas cleared during the preactivity survey if it is left idle. In this event, WBO may occupy those newly established burrows. Any necessary preconstruction surveys will follow CBOC Phase II burrow survey protocols (see Section 2.1 for specific protocol requirements). If passive relocation has already occurred, this survey will serve to document that burrows excavated during passive relocation continue to be unoccupied by WBO and no newly established WBO-occupied or WBO-suitable burrows are available for WBO occupation in the Project Disturbance Area. This survey will be conducted by qualified wildlife biologists. In the event any WBO-occupied burrows are observed during the preconstruction survey, they will be passively relocated if they are observed during the nonbreeding season. Passive relocation will occur as described in Section 2.2, above.

If WBO are found occupying a burrow within 250 feet of the Project Disturbance Area during the breeding season (February 1 through August 31), a minimum of a 250-foot buffer will be flagged surrounding the occupied burrow per CBOC guidelines (the DB will monitor the WBOs to determine if birds are agitated, warranting a larger buffer area to minimize disturbance of the nest). If the exclusion area does not connect with suitable foraging habitat for WBO, the buffer may be extended to 300 feet so that 6.5 acres of foraging habitat is available for the WBOs. Exclusion fencing will be installed and work activity will remain outside of the fenced area until a DB determines the burrow is no longer occupied (e.g., juveniles are foraging independently and are capable of independent survival). Signs will be posted in English and Spanish at the fence line indicating that no entry or disturbance is permitted within the fenced buffer. In addition, at least 10 days prior to the start of any activities in the Project Disturbance Area, the DB will provide to the CPM documentation indicating that nondisturbance buffer fencing has been installed. This documentation will include a description of the burrow, summary of the occupants of the burrow, account of the surrounding habitat conditions, a photograph of the burrow, and latitude/longitude coordinates for the burrow.

In the event that any WBO-suitable burrows with no sign of occupation are found (e.g., no wash, pellets, feathers) during the preconstruction survey, such burrows will be investigated to ensure WBO and other wildlife do not occupy the burrow (e.g., with a fiber-optic scope camera), excavated with hand tools using flexible pipe to allow wildlife to escape, and refilled to prevent occupation by WBO. The results of each preconstruction survey will be included in the next monthly report on the implementation of WBO avoidance and minimization measures to the CPM, CDFG, and USFWS. This information will also be included in the Project's Annual Compliance Report.

3.0 MONITORING

3.1 MONITORING PASSIVE RELOCATION AREAS LEFT IDLE FOR MORE THAN 30 DAYS

Passive relocation efforts should be timed to occur within 30 days of work commencing within the vicinity of the WBO burrow. Since it may not be feasible for the contractor to clear and grub the entire Project footprint within 30 days of passive relocation, areas that are adjacent to the work area in the vicinity of the previous location of the WBO burrow will be monitored until disturbance commences. The frequency of the monitoring will depend on the abundance of fossorial mammal activity and the friability of soils in this area. This monitoring will reduce the likelihood that other resident wildlife species are able to reexcavate burrows, allowing WBO to reoccupy those burrows. Surveys for passively relocated WBOs (color banded birds) will be conducted. These surveys will use binoculars, spotting scope and/or a camera to view the color band and will not involve trapping the birds. Results of this monitoring will be included in the Project's Annual Compliance Report.

3.2 NESTING SEASON OCCUPIED BURROW MONITORING

Construction activities in the Project Disturbance Area cannot occur within 250 feet of an occupied burrow during the nesting season (February 1 through August 31) or 160 feet during the nonnesting season (September 1 through January 31) and this buffer may be extended to 300 feet if it is necessary to include foraging habitat for the WBOs (i.e. in the event the burrow and the buffer do not connect to intact habitat). The DB or BM will monitor these avoidance areas to determine that construction activity does not encroach into the avoidance area. If a qualified biologist determines that egg-laying has not begun or that the young are foraging independently, the DB may consult with the CPM and CDFG to determine if passive relocation efforts can be initiated.

Additional monitoring and adaptive management measures to prevent disturbance to nesting birds from construction-related activities will be employed as determined necessary by the DB or a BM and CPM. Any adaptive management measures will be determined in consultation with the CPM, CDFG, and USFWS. Triggers for adaptive management will be evidence of Project-related disturbance to nesting owls such as agitation behavior (displacement, avoidance, and defense), increased vigilance behavior at burrow sites, changes in foraging and feeding behavior, or nest site abandonment.

Monitoring will occur each month and findings will be included in the monthly report on the implementation of WBO avoidance and minimization measures to the CPM, CDFG, and USFWS for the duration of construction. This information will also be included in the Project's Annual Compliance Report.

3.3 ARTIFICIAL BURROW AND RELOCATION AREA MONITORING

Post-relocation monitoring will include two spring and two winter censuses of the relocation site to determine if burrowing owls are using natural or artificial burrows within the relocation area. The second survey within a season will be conducted within 30 days of the first survey for that season. Monitoring will occur for 2 years. Maintenance of artificial burrows will occur three to four times during the year immediately following relocation, as necessary, to ensure boxes are usable for the breeding and nonbreeding seasons.

During spring and winter visits to the WBO artificial burrow and relocation site to occur for 2 years, the DB or a BM will record observations of relocated WBO and/or occurrences of migrating or other local WBO using the artificial burrows and relocation site, evidence of known predators or humans visiting or disturbing the site, and any other pertinent data gathered through the monitoring. Findings will be included in the report on the implementation of WBO avoidance and minimization measures to the CPM, CDFG, and USFWS for the duration of construction. This information will also be included in the Project's Annual Compliance Report.

3.4 MONITORING OF COMPENSATION LANDS

If WBOs are observed and passive relocation efforts are therefore necessary, then the DB will monitor the compensation lands and suitable habitat within a 600 meter radius from the project site. These surveys will occur as discussed in Sections 2.3 and 3.3 and also according to CBOC (1993) and CDFG (1995) guidelines for WBO surveys (Appendix B). The survey effort will include two spring and two winter surveys for two years following eviction. The purpose of these surveys is to determine the relocation success after exclusion of the WBOs from the project area. Since the excluded WBOs will be banded, individual success can be monitored for the excluded WBOs if they can be located. Any observations of banded owls will be reported.

The survey effort will include inspection of the artificial burrows and noting the observation of natural burrows that can function for WBOs. The monitoring of artificial burrows will occur concurrently with the surveys required. If the relocated WBOs are not nesting in the compensation lands and if any possible remedial actions can be developed and implemented to

correct this then along with consultation with the CPM, CDFG and the USFWS these remedial actions will be implemented.

However, there are circumstances under which WBO may not be nesting in the compensation lands and there are no remedial actions to remedy this. These circumstances include predation or death of WBO, since both death and predation are normal natural occurrences for WBOs. If the relocated WBOs nest in an area other than the compensation lands but not within the project site, this also may be a situation where no remedial action is necessary. It would not be in the best interest to again relocate these WBOs unless they are in imminent danger. If the compensation lands are maintained to provide WBO habitat in perpetuity, the relocated WBOs may provide offspring that will eventually inhabit the compensation lands.

The results of the survey efforts including the status of the artificial burrows and any necessary remedial actions will be included in the Project's Annual Compliance Report.

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4.0 AVOIDANCE OF OCCUPIED BURROWING OWL BURROWS DURING CONSTRUCTION ACTIVITIES

If a burrow is found to be occupied by WBO during the nesting season (February 1 through August 31) or owls are observed to be breeding outside of the nesting season (September 1 through January 31), it is essential that the nest not be disturbed. Activities within the burrow area need to be restricted to avoid nest abandonment.

An exclusion area surrounding occupied burrows will be established and monitored during construction activities. A non-disturbance buffer zone of a minimum of 250 feet will be established around the nest burrow(s) with exclusion fencing. If the occupied burrow and 250 foot buffer does not connect with habitat that will remain intact, the buffer will be increased to 300 feet to allow for 6.5 acres of foraging habitat surrounding the nest burrow. Signage will be placed around the fencing stating that entry is prohibited and that any breaches be reported immediately. The DB will regularly monitor the non-disturbance buffer and evaluate the behavior of WBO. The DB will evaluate whether or not the exclusion area is sufficient to avoid nest abandonment from disturbance related to construction activities. If distress and indicators of reduced nesting success are observed, adaptive management will be employed to reduce stress to the nesting pair. Additional measures may include an increase in the non-disturbance buffer, shifting of the type of activities or work area, and/or visual buffers.

These measures will be in place until it has been determined that the pair is not nesting (i.e., outside the nesting season with no eggs laid or that the young have fledged and are foraging independently). Passive relocation will occur as described above in Section 2.

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5.0 WORKER ENVIRONMENTAL AWARENESS PROGRAM (WEAP) TRAINING

To comply with the CEC COC BIO-5, a WEAP will be implemented upon approval by the CPM and prior to site mobilization. The WEAP is a program designed to inform all employees and employees of contractors and subcontractors who will work on the Project site or facilities during site mobilization, ground disturbance, grading, construction, operation, and closure of the sensitive biological, cultural and paleontological resources within the Project area. The biological component of the WEAP will be presented by the DB (in person or through another competent person with a video of the DB) and will include the locations of sensitive biological resources on the Project site and surrounding area, including WBO; reasons for species protection; explanation of the temporary and permanent habitat protection measures; penalties for violation of applicable laws; contact information for comments or questions about the material in the WEAP; and a training acknowledgment form.

The number of people who have completed WEAP training in the prior month will be included in the Monthly Compliance Report.

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6.0 REPORTING

If any WBOs are relocated, an annual report will be submitted to CEC, CDFG, and USFWS no later than January 31 of each year for two years post-relocation. The reports will detail the findings of the survey of the compensation lands and suitable habitat within a 600 meter radius (monitoring survey results) to assess relocation success and use of artificial burrows (COC BIO-13, 3.A). These surveys will be conducted twice in the spring and twice in the winter following eviction and will continue for two years.

The annual reports will include the date when passive relocation efforts began, the date of burrow excavations, findings, dates of initiation of construction activities and results of survey efforts in compensation lands. Additionally, any injuries, mortality, or other unforeseen circumstances will be reported to all resource agencies within 24 hours.

Reports will include the following data:

- Project name, locations, and all pertinent information pertaining to the origin site;
- Known predators or humans visiting or disturbing the site;
- Any observations of banded relocated WBOs;
- Dates of removal of one-way exclusion doors and the collapse of unoccupied burrows;
- Monitoring results;
- Any other pertinent data gathered through the exclusion and passive relocation efforts, and post-relocation monitoring; and
- Remedial measures taken.

If it is determined during this two year survey period that the existing natural habitat within the compensation lands will conceptually support WBO in perpetuity, then further surveys may not be necessary. In order for this conclusion to be reached, at a minimum the following criteria must be met:

- sufficient natural burrows exist to support the relocated owls (five per pair) and burrowing mammals are present to create new burrows;

-
- weeds that are moderate to high threat to California wildlands are either not present or are less than 10% cover of the shrub and herb layers; and
 - humans are not known to be visiting or disturbing the site.

7.0 WESTERN BURROWING OWL COMPENSATION LANDS

As discussed above, the Applicant owns approximately 647 acres of habitat west of the Project area. Within this parcel, the Applicant proposes to compensate for impacts to sensitive resources, including DT, Mohave ground squirrel, and WBO, and provide the locations for artificial burrows for WBO within an approximately 118.2-acre compensation lands site (Figures 2 and 3). The Applicant assessed the proposed compensation lands site as supporting biological resources that include components of suitable WBO habitat (AECOM 2010). If passive relocation is necessary, a WBO survey of the compensation land site will identify if the site is currently occupied by WBO and identify locations for placement of artificial burrows. It is anticipated that this 118.2 acres would fully mitigate potential Project impacts to WBO.

As specified in BIO-13 of the COCs, offsite mitigation for impacts to the occupied WBO habitat will follow CBOC guidelines. The guidelines specify that 9.75 acres of preserved offsite habitat is required to mitigate for one WBO or WBO pair if the habitat is occupied by WBO, or 19.5 acres of preserved offsite habitat if the habitat is unoccupied by WBO. Based on the results of previous WBO surveys of the Project area and surrounding buffers, it is anticipated that the 118.2 acres will be sufficient to provide compensation for the pairs (or individuals assumed to be pairs) of WBO that have been or may be identified within the Project area or buffers. Per the CBOC and CDFG mitigation guidelines, a preconstruction survey will be conducted to determine the number of WBO pairs and the amount of compensation land that will be required to be protected.

The ultimate goal of the compensation lands is for the preservation of suitable habitat for DT, Mohave ground squirrel and WBO in perpetuity. Initially artificial burrows will be installed to encourage the use of this area by WBO, but for preserved areas to function long-term, maintenance should be minimal.

The compensation lands will be managed in perpetuity for the benefit of WBOs with the following specific goals:

- a. Initial maintenance of the functionality of artificial burrows. The DB will survey the compensation land using methods consistent with Phase II and III CBOC (1993) guidelines four times per year for two years following WBO eviction (twice in the spring and twice in the winter). During this survey effort the DB will check the functionality of any artificial burrows. If any artificial burrows require maintenance or

repair, they will be repaired or replaced within two weeks of the survey effort. The BIO-13 COC requires five artificial burrows for each burrowing owl burrow that was destroyed. Artificial burrows should therefore be sufficient to support passively relocated WBOs. Any natural burrows would also be mapped during this survey effort (Phase III of CBOC guidelines). No remedial actions for natural burrows are planned, but the presence of sufficient natural burrows may preclude the need for further maintenance of artificial burrows after two years. Ultimately it is preferable if WBOs are using natural burrows rather than artificial burrows, so if it is noted that there are sufficient natural burrows for WBOs and/or WBOs are using natural burrows, this is a sign of success of the compensation lands. However, if sufficient natural burrows are not present, further surveys to determine the functionality of artificial burrows may be necessary.

- b. Since the goal of the compensation lands is to function to provide habitat with minimal human interference, the management goals should be geared to remove or reduce human induced changes in habitat that would reduce desirability for those species that are to be preserved within the compensation lands. To that end, weed management through the minimization of occurrence of weed species at less than 10% cover of the shrub and herb layers is necessary. The weed species managed are those considered “moderate” or “high” threat to California wildlands (as defined by the California Invasive Plant Council [CAL-IPC 2006], noxious weeds rated “A” or “B” by the California Department of Food and Agriculture, and any federally rated pest plants [CDFA 2010]). During the identification of the compensation lands and the continued monitoring of the compensation lands, the weed cover will be measured. If the threshold of 10% cover of weedy species is observed, specific weed control measures will be developed as part of the Weed Management Plan, included in the appendix of the Compensation Land Management Plan, once the parcels for the compensation lands have been identified.

Success will be measured by the ability of the compensation lands to function as suitable WBO habitat that will be preserved in perpetuity. Monitoring will occur for the first two years after passive relocation. The main purpose of the monitoring is to determine if burrows are available for WBO and that the habitat is not modified by weedy species (especially if this modification reduces the openness of the habitat). If natural burrows are not available for WBO, then the continued maintenance of artificial burrows will be required. If weedy species exceed the 10% threshold then the weed cover will need to be managed. During the monitoring effort any observations of the banded passively relocated birds will be made. However, it is not possible to assume failure if the relocated WBOs are predated or die since predation and death are both situations that occur naturally for WBOs. It is also not possible to assume failure if the WBOs do

not inhabit the artificial burrows since the WBOs may use already existing natural burrows and this is actually preferable for the long-term preservation of the WBOs here. Therefore, the compliance goals will be determined to be met if the artificial burrows are capable of supporting burrowing owls for two years, if after that two year period natural burrows are sufficiently present to support WBO (and if this is not possible, then continued maintenance of artificial burrows will be required) and if the weedy species do not exceed 10% cover. The results of the monitoring survey efforts including the status of the artificial and natural burrows and weed cover will be included in the Project's Annual Compliance Report.

With approval of the CPM in consultation with CDFG, ASI would discontinue monitoring of the mitigation site after the two year survey period and the required annual reporting is complete if it can be shown that the Plan has met the applicable criteria. The criteria includes maintaining the functionality of artificial and natural burrows and minimizing occurrence of weeds at less than 10% cover of the shrub and herb layers.

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8.0 REFERENCES

AECOM

- 2010 Abengoa Mojave Solar Project Compensatory Mitigation Site Details Letter Report. April.

California Burrowing Owl Consortium (CBOC)

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

California Department of Fish and Game (CDFG)

- 1995 Staff report on burrowing owl mitigation. Unpublished report.

California Department of Food and Agriculture (CDFA)

- 2010 Pest Ratings of Noxious Weed Species and Noxious Weed Seed. State of California Department of Food and Agriculture, Division of Plant Health & Pest Prevention Services. January.

California Invasive Plant Council (Cal-IPC)

- 2006 California Invasive Plant Inventory. Cal-IPC Publication 2006-02. California Invasive Plant Council: Berkeley, California. Available at www.cal-ipc.org.

California Energy Commission (CEC)

- 2010 Abengoa Mojave Solar Project: Commission Decision. CEC-800-2010-008 - CMF, Docket Number 09-AFC-5.

Clark, H. O., Jr., and D. L. Plumpton

- 2005 A Simple One-Way Door Design for Passive Relocation of Western Burrowing Owls. California Fish and Game 91:286-289. Available at <http://www.docstoc.com/docs/1660512/Clark-HO-Jr-and-DL-Plumpton-2005-A-simple-one-way-door-design-for-passive-relocation-of-western-burrowing-owls--California-Fish-and-Game-91286-289>.

EDAW

- 2007 Harper Lake Solar Project Burrowing Owl Presence/Absence Survey, San Bernardino County, California. December.

2009 Report Summarizing Results of the Proposed Harper Lake Solar Project Burrowing Owl Presence/Absence Surveys. January.

Karl, Alice E.

2011 Mojave Solar Project: Desert Tortoise Clearance and Relocation/Translocation Plan. January.

Mojave Solar, LLC (MSLLC)

2009 Mojave Solar Project Application for Certification. Volumes 1 through 3. July.

Trulio, Lynne A.

1995 Passive Relocation: A Method to Preserve Burrowing Owls on Disturbed Sites. *Journal of Field Ornithology* 66(11): 99–106.

APPENDIX A

**CALIFORNIA ENERGY COMMISSION CONDITIONS
OF CERTIFICATION BIO-13**

3. Relocation. Any MGS captured via trapping or burrow excavation shall be relocated to suitable habitat adjacent to the project site, which provides conditions suitable for the long-term survival of relocated MGS.

Verification: Within 30 days of completion of MGS clearance surveys, the Designated Biologist shall submit a report to the CPM and CDFG describing how the measures described above were implemented. The report shall include the MGS survey results, capture and release locations of any relocated squirrels, and any other information needed to demonstrate compliance with the measures described above.

Burrowing Owl Impact Avoidance, Minimization and Mitigation Measures

BIO-13 Prior to preconstruction surveys, a Burrowing Owl Monitoring and Mitigation Plan (Burrowing Owl Plan) shall be developed by the project owner in consultation with the CPM and CDFG. This plan shall include detailed measures to avoid and minimize impacts to burrowing owls in and near the construction areas (if identified during surveys) and shall be consistent with CDFG guidance (CDFG 1995). In addition, the plan shall identify the optimal time to concurrently relocate both desert tortoise and burrowing owl. At a minimum, the following measures shall be included in the plan and implemented by the project owner to manage their construction site, and related facilities, in a manner to avoid, minimize, or mitigate impacts to breeding and foraging burrowing owls.

1. Pre-Construction Surveys and Nest Avoidance. The Designated Biologist shall conduct pre-construction surveys for burrowing owls within the project site and a 160-foot buffer. These surveys shall be conducted concurrent with desert tortoise clearance surveys, to the maximum extent possible. The following shall be included in the Plan and implemented to avoid and minimize impacts to burrowing owls onsite:

Pre-construction surveys shall be conducted prior to the nesting season (February 1 through August 31) and all burrowing owls will be passively relocated using one-way trap doors. Once the Designated Biologist has verified that all burrowing owls have vacated an occupied burrow, the Designated Biologist shall collapse the burrow, preventing re-occupation.

- A. If ground disturbance cannot be avoided in areas where nesting burrowing owls are active, a 250-foot exclusion area around occupied burrows will be flagged and this area will not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are

foraging independently and are capable of independent survival. The exclusion area shall remain connected to natural area(s) to the extent possible, to avoid completely surrounding the owl with construction activities and/or equipment.

2. Artificial Burrow Installation. Prior to any ground-disturbing activities, the project owner shall install five artificial burrows for each identified burrowing owl burrow in the project area that would be destroyed, within in the approved compensatory habitat area. The Designated Biologist shall survey the site selected for artificial burrow construction to verify that such construction will not affect desert tortoise or Mohave ground squirrel or existing burrowing owl colonies in the relocation area. Installation of the artificial burrows shall occur after baseline surveys of the relocation area and prior to ground disturbance or heavy equipment staging. Design of the artificial burrows shall be consistent with CDFG guidelines (CDFG 1995) and shall be approved by the CPM in consultation with CDFG.
3. Passive Relocation. Prior to passive relocation, any owls that will be relocated shall be color banded with air-craft aluminum bands in accordance with the guidance provided by USGS bird banding lab (<http://www.pwrc.usgs.gov/bbl>) to monitor relocation success. Color banding shall not be conducted during the breeding season. During the non-breeding season, owls would be given a minimum of three weeks to become familiar with the new artificial burrows, after which eviction of owls within the project site could begin. Use of one-way doors described by Trulio (1995) and Clark and Plumpton (2005) would be used to facilitate passive relocation of owls.
 - A. Monitoring and Success Criteria. The Designated Biologist shall survey the compensatory mitigation area and a suitable habitat within a 600 meter radius from the project site to assess use of the artificial burrows by owls and relocation success after exclusion from the project area. Surveys shall be conducted using methods consistent with Phase II and Phase III California Burrowing Owl Consortium guidelines (CBOC 1993). Surveys shall be conducted two times in the spring and two times in the winter following eviction. The second survey within a season shall be conducted within 30 days of the first. Surveys shall continue for a period of two years to encompass a total of two spring seasons (4 total spring surveys) and two winter seasons (4 total winter surveys).

Surveys and monitoring shall be conducted using non-invasive methods (i.e., high-powered binoculars, spotting scope, or camera). Owls shall not be trapped or otherwise handled to read the color band.

If survey results indicate burrowing owls are not nesting within the surveyed area, remedial actions may be developed and implemented in consultation with the CPM, CDFG and USFWS to correct conditions at the site that might be preventing owls from nesting there. A report describing survey results and any remedial actions taken shall be submitted to the CPM, CDFG and USFWS no later than January 31 of each year for two years.

4. Preserve and Manage Compensatory Habitat. For each individual owl or pair identified on the project site during pre-construction surveys, off-site mitigation shall be required as described in the California Burrowing Owl Consortium guidelines (CBOC 1993). Determining which ratio to apply depends on whether the proposed compensatory habitat is occupied or unoccupied.
 - A. Replacement of occupied habitat with occupied habitat: 1.5 times 6.5 (9.75) acres per pair of single bird
 - B. Replacement of occupied habitat with suitable unoccupied habitat: 3 times 6.5 (19.5) acres per pair of single bird.

Compensatory habitat shall be suitable for occupation by burrowing owls and preserved and managed in perpetuity for this purpose. Compensatory mitigation may be within the 118.2 acres proposed for desert tortoise and MGS (refer to **BIO-15**), provided that it also meets the criteria for suitable burrowing owl habitat. The compensatory habitat shall be managed for the benefit of burrowing owls, with the specific goals of:

- A. Maintaining the functionality of artificial and natural burrows; and
- B. Minimizing the occurrence of weeds (species considered “moderate” or “high” threat to California wildlands as defined by CAL-IPC [2006] and noxious weeds rated “A” or “B” by the California Department of Food and Agriculture and any federal-rated pest plants [CDFG 2009]) at less than 10% cover of the shrub and herb layers.

The Burrowing Owl Plan shall also include monitoring and maintenance requirements for the compensatory habitat, details on methods for measuring compliance goals, and remedial actions to be taken if management goals are not met.

The final Burrowing Owl Plan is due before preconstruction surveys begin to ensure that an approved relocation methodology will be followed for any owls occurring within the project area. Therefore, it is understood that the compensatory mitigation acreage (if required) may not be identified in the Burrowing Owl Plan. However, the Plan shall propose a location for compensatory mitigation land and the acreage required, quantified according to the CBOC methods outlined above. If owls are identified during the pre-construction survey, the project owner shall submit an addendum to the Burrowing Owl Plan, which identifies the number of owls identified and the exact acreage to be preserved and managed in perpetuity for burrowing owl based on the results of the preconstruction survey and as agreed to in consultation with CDFG.

Verification: At least 45 days prior to start of any pre-construction site mobilization, the project owner shall provide the CPM and CDFG with the final version of the Burrowing Owl Monitoring and Mitigation Plan that has been reviewed and approved by the CPM in consultation with CDFG. An addendum to the plan, which includes the pre-construction survey results, (e.g., number of owls identified onsite) and the CDFG-approved amount of compensatory mitigation, shall be submitted within 10 days of completing the burrowing owl pre-construction surveys. The CPM will determine the acceptability of the Plan and addendum within 15 days of their receipt. All modifications to the approved Plan may be made by the CPM after consultation with CDFG. The project owner shall notify the CPM no less than five working days before implementing any CPM-approved modifications to the Burrowing Owl Monitoring and Mitigation Plan.

American Badger and Desert Kit Fox Impact Avoidance and Minimization Measures

BIO-14 To avoid direct impacts to American badgers and desert kit fox, preconstruction surveys shall be conducted for these species concurrent with the desert tortoise surveys. Surveys shall be conducted as described below:

Biological Monitors shall perform pre-construction surveys for badger setts and kit fox burrows in the project area, including areas within 250 feet of the project site. If burrows are detected, each burrow shall be classified as inactive, potentially active, or definitely active.

Inactive burrows and setts that would be directly impacted by construction activities shall be excavated by hand and backfilled to prevent reuse by badgers or kit fox.

Potentially and definitely active burrows and setts shall not be disturbed during the whelping/pupping season (February 1 – September 30). Potentially and definitely active dens that would be directly impacted by construction activities shall be monitored by the

APPENDIX B

CALIFORNIA DEPARTMENT OF FISH AND GAME STAFF REPORT ON BURROWING OWL MITIGATION

Memorandum

: "Div. Chiefs - IFD, BDD, NED, & WMD
Reg. Mgrs. - Regions 1, 2, 3, 4, & 5

Date : October 17, 1995

From : Department of Fish and Game

Subject :
Staff Report on Burrowing Owl Mitigation

I am hereby transmitting the Staff Report on Burrowing Owl Mitigation for your use in reviewing projects (California Environmental Quality Act [CEQA] and others) which may affect burrowing owl habitat. The Staff Report has been developed during the last several months by the Environmental Services Division (ESD) in cooperation with the Wildlife Management Division (WMD) and regions 1, 2, and 4. It has been sent out for public review and redrafted as appropriate.

Either the mitigation measures in the staff report may be used or project specific measures may be developed. Alternative project specific measures proposed by the Department divisions/regions or by project sponsors will also be considered. However, such mitigation measures must be submitted to ESD for review. The review process will focus on the consistency of the proposed measure with Department, Fish and Game Commission, and legislative policy and with laws regarding raptor species. ESD will coordinate project specific mitigation measure review with WMD.

If you have any questions regarding the report, please contact Mr. Ron Rempel, Supervising Biologist, Environmental Services Division, telephone (916) 654-9980.

COPY Original signed by
C.F. Raysbrook

C. F. Raysbrook
Interim Director

Attachment

cc: Mr. Ron Rempel
Department of Fish and Game
Sacramento

STAFF REPORT ON BURROWING OWL MITIGATION

Introduction

The Legislature and the Fish and Game Commission have developed the policies, standards and regulatory mandates to protect native species of fish and wildlife. In order to determine how the Department of Fish and Game (Department) could judge the adequacy of mitigation measures designed to offset impacts to burrowing owls (*Speotyto cunicularia*; A.O.U. 1991) staff (WMD, ESD, and Regions) has prepared this report. To ensure compliance with legislative and commission policy, mitigation requirements which are consistent with this report should be incorporated into: (1) Department comments to Lead Agencies and project sponsors pursuant to the California Environmental Quality Act (CEQA); and (2) other authorizations the Department gives to project proponents for projects impacting burrowing owls.

This report is designed to provide the Department (including regional offices and divisions), CEQA Lead Agencies and project proponents the context in which the Environmental Services Division (ESD) will review proposed project specific mitigation measures. This report also includes preapproved mitigation measures which have been judged to be consistent with policies, standards and legal mandates of the Legislature, the Fish and Game Commission and the Department's public trust responsibilities. Implementation of mitigation measures consistent with this report are intended to help achieve the conservation of burrowing owls and should compliment multi-species habitat conservation planning efforts currently underway. The *Burrowing Owl Survey Protocol and Mitigation Guidelines* developed by The California Burrowing Owl Consortium (CBOC 1993) were taken into consideration in the preparation of this staff report as were comments from other interested parties.

A range-wide conservation strategy for this species is needed. Any range-wide conservation strategy should establish criteria for avoiding the need to list the species pursuant to either the California or federal Endangered Species Acts through preservation of existing habitat, population expansion into former habitat, recruitment of young into the population, and other specific efforts.

California's burrowing owl population is clearly declining and, if declines continue, the species may qualify for listing. Because of the intense pressure for urban development within suitable burrowing owl nesting and foraging habitat (open, flat and gently rolling grasslands and grass/shrub lands) in California, conflicts between owls and development projects often occur. Owl survival can be adversely affected by disturbance and foraging habitat loss even when impacts to individual birds and nests/burrows are avoided. Adequate information about the presence of owls is often unavailable prior to project approval. Following project approval there is no legal mechanism through which to seek mitigation other than avoidance of occupied burrows or nests. The absence of standardized survey methods often impedes consistent impact assessment.

Burrowing Owl Habitat Description

Burrowing owl habitat can be found in annual and perennial grasslands, deserts, and arid scrublands characterized by low-growing vegetation (Zarn 1974). Suitable owl habitat may also include trees and shrubs if the canopy covers less than 30 percent of the ground surface. Burrows are the essential component of burrowing owl habitat. Both natural and artificial burrows provide protection, shelter, and nests for burrowing owls (Henny and Blus 1981). Burrowing owls typically use burrows made by fossorial mammals, such as ground squirrels or badgers, but also may use man-made structures such as cement culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement.

Occupied Burrowing Owl Habitat

Burrowing owls may use a site for breeding, wintering, foraging, and/or migration stopovers. Occupancy of suitable burrowing owl habitat can be verified at a site by detecting a burrowing owl, its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance. Burrowing owls exhibit high site fidelity, reusing burrows year after year (Rich 1984, Feeney 1992). A site should be assumed occupied if at least one burrowing owl has been observed occupying a burrow there within the last three years (Rich 1984).

CEQA Project Review

The measures included in this report are intended to provide a decision-making process that should be implemented whenever there is potential for an action or project to adversely affect burrowing owls. For projects subject to the California Environmental Quality Act (CEQA), the process begins by conducting surveys to determine if burrowing owls are foraging or nesting on or adjacent to the project site. If surveys confirm that the site is occupied habitat, mitigation measures to minimize impacts to burrowing owls, their burrows and foraging habitat should be incorporated into the CEQA document as enforceable conditions. The measures in this document are intended to conserve the species by protecting and maintaining viable populations of the species throughout their range in California. This may often result in protecting and managing habitat for the species at sites away from rapidly urbanizing/developing areas. Projects and situations vary and mitigation measures should be adapted to fit specific circumstances.

Projects not subject to CEQA review may have to be handled separately since the legal authority the Department has with respect to burrowing owls in this type of situation is often limited. The burrowing owl is protected from "take" (Section 3503.5 of the Fish and Game Code) but unoccupied habitat is likely to be lost for activities not subject to CEQA.

Legal Status

The burrowing owl is a migratory species protected by international treaty under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 C.F.R. Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. 21). Sections 3505, 3503.5, and 3800 of the California Department of Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs. To avoid violation of the take provisions of these laws generally requires that project-related disturbance at active nesting territories be reduced or eliminated during the nesting cycle (February 1 to August 31). Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) may be considered “take” and is potentially punishable by fines and/or imprisonment.

The burrowing owl is a Species of Special Concern to California because of declines of suitable habitat and both localized and statewide population declines. Guidelines for the Implementation of the California Environmental Quality Act (CEQA) provide that a species be considered as endangered or “rare” regardless of appearance on a formal list for the purposes of the CEQA (Guidelines, Section 15380, subsections b and d). The CEQA requires a mandatory findings of significance if impacts to threatened or endangered species are likely to occur (Sections 21001 (c), 2103; Guidelines 15380, 15064, 15065). To be legally adequate, mitigation measures must be capable of “avoiding the impact altogether by not taking a certain action or parts of an action”; “minimizing impacts by limiting the degree or magnitude of the action and its implementation”; “rectifying the impact by repairing, rehabilitating or restoring the impacted environment”; “or reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action” (Guidelines, Section 15370). Avoidance or mitigation to reduce impacts to less than significant levels must be included in a project or the CEQA lead agency must make and justify findings of overriding considerations.

Impact Assessment

Habitat Assessment

The project site and a 150 meter (approximately 500 ft.) buffer (where possible and appropriate based on habitat) should be surveyed to assess the presence of burrowing owls and their habitat (Thomsen 1971, Martin 1973). If occupied habitat is detected on or adjacent to the site, measures to avoid, minimize, or mitigate the project’s impacts to the species should be incorporated into the project, including burrow preconstruction surveys to ensure avoidance of direct take. It is also recommended that preconstruction surveys be conducted if the species was not detected but is likely to occur on the project site.

Burrowing Owl and Burrow Surveys

Burrowing owl and burrow surveys should be conducted during both the wintering and nesting seasons, unless the species is detected on the first survey. If possible, the winter survey should be conducted between December 1 and January 31 (when wintering owls are most likely to be present) and the nesting season survey should be conducted between April 15 and July 15 (the peak of the breeding season). Surveys conducted from two hours before sunset to one hour after, or from one hour before to two hours after sunrise, are also preferable.

Surveys should be conducted by walking suitable habitat on the entire project site and (where possible) in areas within 150 meters (approx. 500 ft.) of the project impact zone. The 150-meter buffer zone is surveyed to identify burrows and owls outside of the project area which may be impacted by factors -such as noise and vibration (heavy equipment, etc.) during project construction. Pedestrian survey transects should be spaced to allow 100 percent visual coverage of the ground surface. The distance between transect center lines should be no more than 30 meters (approx. 100 ft.) and should be reduced to account for differences in terrain, vegetation density, and ground surface visibility. To effectively survey large projects (100 acres or larger), two or more surveyors should be used to walk adjacent transects. To avoid impacts to owls from surveyors, owls and/or occupied burrows should be avoided by a minimum of 50 meters (approx. 160 ft.) wherever practical. Disturbance to occupied burrows should be avoided during all seasons.

Definition of Impacts

The following should be considered impacts to the species:

- Disturbance within 50 meters (approx. 160 ft.) Which may result in harassment of owls at occupied burrows;
- Destruction of natural and artificial burrows (culverts, concrete slabs and debris piles that provide shelter to burrowing owls); and
- Destruction and/or degradation of foraging habitat adjacent (within 100 m) of an occupied burrow(s).

Written Report

A report for the project should be prepared for the Department and copies should be submitted to the Regional contact and to the Wildlife Management Division Bird and Mammal Conservation Program. The report should include the following information:

- Date and time of visit(s) including name of the qualified biologist conducting surveys, weather and visibility conditions, and survey methodology;
- Description of the site including location, size, topography, vegetation communities, and animals observed during visit(s);
- Assessment of habitat suitability for burrowing owls;
- Map and photographs of the site;
- Results of transect surveys including a map showing the location of all burrow(s) (natural or artificial) and owl(s), including the numbers at each burrow if present and tracks, feathers, pellets, or other items (prey remains, animal scat);
- Behavior of owls during the surveys;
- Summary of both winter and nesting season surveys including any productivity information and a map showing territorial boundaries and home ranges; and
- Any historical information (Natural Diversity Database, Department regional files? Breeding Bird Survey data, American Birds records, Audubon Society, local bird club, other biologists, etc.) regarding the presence of burrowing owls on the site.

Mitigation

The objective of these measures is to avoid and minimize impacts to burrowing owls at a project site and preserve habitat that will support viable owls populations. If burrowing owls are detected using the project area, mitigation measures to minimize and offset the potential impacts should be included as enforceable measures during the CEQA process.

Mitigation actions should be carried out from September 1 to January 31 which is prior to the nesting season (Thomsen 1971, Zam 1974). Since the timing of nesting activity may vary with latitude and climatic conditions, this time frame should be adjusted accordingly. Preconstruction surveys of suitable habitat at the project site(s) and buffer zone(s) should be conducted within the 30 days prior to construction to ensure no additional, burrowing owls have established territories since the initial surveys. If ground disturbing activities are delayed or suspended for more than 30 days after the preconstruction survey, the site should be resurveyed.

Although the mitigation measures may be included as enforceable project conditions in the CEQA process, it may also be desirable to formalize them in a Memorandum of Understanding (MOU) between the Department and the project sponsor. An MOU is needed when lands (fee title or conservation easement) are being transferred to the Department.

Specific Mitigation Measures

1. Occupied burrows should not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by the Department verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.
2. To offset the loss of foraging and burrow habitat on the project site, a minimum of 6.5 acres of foraging habitat (calculated on a 100 m {approx. 300 ft.} foraging radius around the burrow) per pair or unpaired resident bird, should be acquired and permanently protected. The protected lands should be adjacent to occupied burrowing owl habitat and at a location acceptable to the Department. *Protection of additional habitat acreage per pair or unpaired resident bird may be applicable in some instances.* The CBOC has also developed mitigation guidelines (CBOC 1993) that can be incorporated by CEQA lead agencies and which are consistent with this staff report.
3. When destruction of occupied burrows is unavoidable, existing unsuitable burrows should be enhanced (enlarged or cleared of debris) or new burrows created (by installing artificial burrows) at a ratio of 2:1 on the protected lands site. One example of an artificial burrow design is provided in Attachment A.
4. If owls must be moved away from the disturbance area, passive relocation techniques (as described below) should be used rather than trapping. At least one or more weeks will be necessary to accomplish this and allow the owls to acclimate to alternate burrows.
5. The project sponsor should provide funding for long-term management and monitoring of the protected lands. The monitoring plan should include success criteria, remedial measures, and an annual report to the Department.

Impact Avoidance

If avoidance is the preferred method of dealing with potential project impacts, then no disturbance should occur within 50 meters (approx. 160 ft.) of occupied burrows during the nonbreeding season of September 1 through January 31 or within 75 meters (approx. 250 ft.) during the breeding season of February 1 through August 31. Avoidance also requires that a minimum of 6.5 acres of foraging habitat be *permanently* preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls (with or without dependent young) or single unpaired resident bird. The configuration of the protected habitat should be approved by the Department.

Passive Relocation - With One-Way Doors

Owls should be excluded from burrows in the immediate impact zone and within a 50 meter (approx. 160 ft.) buffer zone by installing one-way doors in burrow entrances. One-way doors (e.g., modified dryer vents) should be left in place 48 hours to insure owls have left the burrow before excavation. Two natural or artificial burrows should be provided for each burrow in the project area that will be rendered biologically unsuitable. The project area should be *monitored daily for one* week to confirm owl use of burrows before excavating burrows in the immediate impact zone. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe should be inserted into the tunnels during excavation to maintain an escape route for any animals inside the burrow.

Passive Relocation - Without One-Way Doors

Two natural or artificial burrows should be provided for each burrow in the project area that will be rendered biologically unsuitable. The project area should be *monitored daily until the owls have relocated to the new burrows*. The formerly occupied burrows may then be excavated. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe should be inserted into burrows during excavation to maintain an escape route for any animals inside the burrow.

Projects Not Subject to CEQA

The Department is often contacted regarding the presence of burrowing owls on construction sites, parking lots and other areas for which there is no CEQA action or for which the CEQA process has been completed. In these situations, the Department should seek to reach agreement with the project sponsor to implement the specific mitigation measures described above. If they are unwilling to do so, passive relocation without the aid of one-way doors is their only option based upon Fish and Game Code 3503.5.

Literature Cited

- American Ornithologists Union (AOU). 1991. Thirty-eighth supplement to the AOU checklist of North American birds. *Auk* 108:750-754.
- Feeney, L. 1992. Site fidelity in burrowing owls. Unpublished paper presented to Raptor Research Annual Meeting, November 1992. Seattle, Washington.
- Haug, E. A. and L. W. Oliphant. 1990. Movements, activity patterns, and habitat use of burrowing owls in Saskatchewan. *J. Wildlife Management* 54:27-35.
- Henny, C. J. and L. J. Blus. 1981. Artificial burrows provide new insight into burrowing owl nesting biology. *Raptor Research* 15:82-85.
- Martin, D. J. 1973. Selected aspects of burrowing owl ecology and behavior. *Condor* 75:446-456.
- Rich, T. 1984. Monitoring burrowing owl populations: Implications of burrow re-use. *Wildlife Society Bulletin* 12:178-180.
- The California Burrowing Owl Consortium (CBOC). 1993. Burrowing owl survey protocol and mitigation guidelines. Tech. Rep. Burrowing Owl Consortium, Alviso, California.
- Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal Airport. *Condor* 73:177-192.
- Zarn, M. 1974. Burrowing owl. U. S. Department of Interior, Bureau of Land Management. Technical Note T-N 250. Denver, Colorado. 25 pp.

Reproductive Success of Burrowing Owls Using Artificial Nest Burrows in Southeastern Idaho

by Bruce Olenick

Artificial nest burrows were implanted in southeastern Idaho for burrowing owls in the spring of 1986. These artificial burrows consisted of a 12" x 12" x 8" wood nesting chamber with removable top and a 6 foot corrugated and perforated plastic drainage pipe 6 inches in diameter (Fig. 1). Earlier investigators claimed that artificial burrows must provide a natural dirt floor to allow burrowing owls to modify the nesting tunnel and chamber. Contrary to this, the artificial burrow introduced here does not allow owls to modify the entrance or tunnel. The inability to change the physical dimensions of the burrow tunnel does not seem to reflect the owls' breeding success or deter them from using this burrow design.

In 1936, 22 artificial burrows were inhabited. Thirteen nesting attempts yielded an average clutch size of 8.3 eggs per breeding pair. Eight nests successfully hatched at least 1 nestling. In these nests, 67 of 75 eggs hatched (59.3%) and an estimated 61 nestlings (91.0%) fledged. An analysis of the egg laying and incubation periods showed that incubation commenced well after egg lay-

ing began. Average clutch size at the start of incubation was 5.6 eggs. Most eggs tended to hatch synchronously in all successful nests.

Although the initial cost of constructing this burrow design may be slightly higher than a burrow consisting entirely of wood, the plastic pipe burrow offers the following advantages: (1) it lasts several field seasons without rotting or collapsing; (2) it may prevent or retard predation; (3) construction time is min-

imal; (4) it is easy to transport, especially over long distances; and (5) the flexible tunnel simplifies installation. The use of this artificial nest burrow design was highly successful and may prove to be a great resource technique for future management of this species.

For additional information on constructing this artificial nest burrow, contact Bruce Olenick, Department of Biology, Idaho State University, Pocatello, ID 83209.

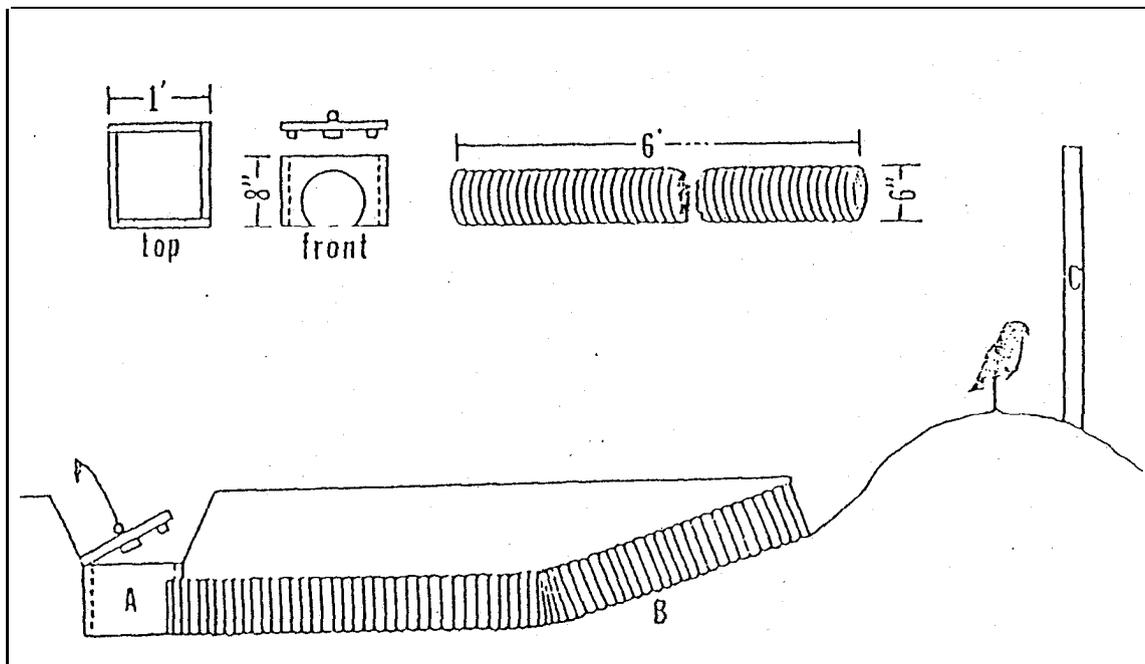


fig. 1 Artificial nest burrow design for burrowing owls. Entire unit (including nest chamber) is buried 12" -- 18" below ground for maintaining thermal stability of the nest chamber. A = nest chamber, B = plastic pipe. C = perch.

APPENDIX F

**TAMARISK ERADICATION,
MONITORING, AND REPORTING PLAN**

APPENDIX G

MONITORING IMPACTS OF SOLAR COLLECTION TECHNOLOGY ON BIRDS STUDY

APPENDIX H

COMMON RAVEN MONITORING, MANAGEMENT, AND CONTROL PLAN

APPENDIX I

EVAPORATION POND MONITORING AND ADAPTIVE MANAGEMENT PLAN

APPENDIX J

**U.S. FISH AND WILDLIFE SERVICE (USFWS)
BIOLOGICAL OPINION**



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
81440-2011-F-0044

March 17, 2011

Matthew C. McMillen
Director of Environmental Compliance, Loan Guarantee Program Office
Department of Energy
1000 Independence Ave. SW, LP-10
Washington, D.C. 20585

Roxie Trost
Field Manager, Barstow Field Office
Bureau of Land Management
2601 Barstow Road
Barstow, California 92311

Subject: Biological Opinion on Mojave Solar, LLC's Mojave Solar Project, San Bernardino County, California (8-8-11-F-3)

Dear Mr. McMillen and Ms. Trost:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the Department of Energy's (DOE) proposed issuance of a loan guarantee to Mojave Solar, LLC for the construction, operation, and maintenance of the Mojave Solar facility and the Bureau of Land Management's (Bureau) proposed issuance of five right-of-way grants to Southern California Edison (SCE) for the telecommunication systems necessary for the operation of the Mojave Solar facility and their effects on the federally threatened desert tortoise (*Gopherus agassizii*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act). Together, the Mojave Solar facility site and the installation of the fiber optic lines constitute the Mojave Solar Project. Because Mojave Solar LLC is a project company of Abengoa Solar Inc. (Abengoa), this biological opinion refers to the project proponent of the solar field as Abengoa. The proposed project involves construction, operation, and maintenance of a 1,765-acre solar power generating facility, the construction and operation of the Lockhart substation, and the installation of 3 fiber optic lines to connect the facility to the electrical grid. The DOE will maintain discretionary authority over the Mojave Solar facility for the duration of the loan; authority over SCE's fiber optic lines will be exercised by the Bureau. We received your electronic request for formal consultation on October 4, 2010.

TAKE PRIDE
IN AMERICA 

This biological opinion is based on information that accompanied your October 4, 2010, request for consultation (AECOM 2010), additional information available from the California Energy Commission's (CEC) permitting process, and clarification of the project description and desert tortoise translocation strategy obtained from DOE staff during the formal consultation process. This additional information includes the draft desert tortoise translocation plan (Karl 2011), staff assessment (CEC 2010a), supplemental staff assessment, part B (CEC 2010b). A complete record of this consultation can be made available at the Ventura Fish and Wildlife Office.

Consultation History

On November 23, 2010, we responded to your request for initiation of formal consultation with a memorandum that identified that the biological assessment had sufficient information to commence the consultation. We noted, however, that we required clarification on several issues and a final desert tortoise translocation plan to be approved by the Bureau and Service (Service 2010a, Blackford 2010). We provided comments on a draft desert tortoise translocation plan on December 7, 2010, and Abengoa submitted a new draft desert tortoise translocation plan December 20, 2010.

On March 2, 2011, we issued a draft biological opinion to the DOE and Bureau (Service 2011). We revised the draft biological opinion based on comments from the DOE, Bureau, Abengoa, and SCE.

Your request for consultation contained your determination that the proposed project is not likely to adversely affect critical habitat of the desert tortoise. Abengoa's component of the project (solar facility) does not occur within and would not affect desert tortoise critical habitat. SCE proposes to install a fiber optic line through 32.79 miles of the Fremont-Kramer Critical Habitat Unit between the Lockhart to Tortilla, Lockhart to Kramer and Kramer to Victor substations. Approximately 11.51 acres along the 32.79 miles of transmission line within critical habitat would be affected. The largest disturbed area in any single location would be approximately 0.1 acre. The disturbance would include the installation of fiber optic line hardware onto poles, establishing pulling and splicing sites, and placing new poles. The Description of the Proposed Action - Installation of Fiber Optic Lines section of this biological opinion and the biological assessment (AECOM 2010) contain additional information on the installation of the fiber optic lines. The disturbance would occur within the existing utility right-of-way, which supports one or more transmission lines and access roads for these lines.

Your request for formal consultation states that the loss of habitat would occur in "areas that are lacking in many of the primary constituent elements that are required of desert tortoise critical habitat." The biological assessment did not contain any specific information to support this assertion. To assist us in assessing whether we concurred with your determination, we evaluated each primary constituent element of critical habitat of the desert tortoise in light of the nature of the proposed action and our general knowledge of the condition of utility rights-of-way.

The first primary constituent element of desert tortoise critical habitat is sufficient space to support viable populations within each of the six recovery units and to provide for movement, dispersal, and gene flow. The 11.51 acres of disturbance would be distributed in small patches along 32.79 miles of transmission line; no single area of disturbance would exceed 0.1 acre. The effect of this amount of disturbed habitat would not be measurable within the context of the 518,000-acre critical habitat unit in terms of the amount of space available to desert tortoises to support viable populations and to provide for movement, dispersal, and gene flow.

The second primary constituent element is sufficient quality and quantity of forage species and the proper soil conditions to provide for the growth of these species. Installation is likely to remove at least some annual plants (i.e., forage species) at work sites if work is conducted when they are above ground). These activities are also likely to disrupt soil structure to some degree. The home range of a male desert tortoise is approximately 2 square kilometers (O'Conner et al. 1994, Duda et al. 1999, Harless et al. 2009); even if several points of disturbance associated with installation of the fiber optic line occurred within a single desert tortoise's home range, the disturbance of approximately 0.0004 square kilometer (for a single activity) would not substantially alter the quantity of forage species and the proper soil conditions within that home range. Additionally, we cannot quantify the amount of existing disturbance but we expect that at least some of the areas to be used for installation of the fiber optic line have been disturbed by previous activities associated with the construction, operation, and maintenance of the existing transmission line. Consequently, we expect that the installation of the fiber optic line would not have a measurable effect on the quality and quantity of forage species and the soil conditions to provide for the growth of these species

The third primary constituent element of desert tortoise critical habitat is suitable substrates for burrowing, nesting, and overwintering. Installation is likely to degrade, at least to some degree, substrates for burrowing, nesting, and overwintering. As we noted for the previous primary constituent element, the small size of the disturbed areas, the distribution of the disturbed areas over many miles of transmission line, and the likelihood that at least some of the work would occur in previously disturbed areas, we expect that the installation of the fiber optic line would not have a measurable effect on substrates for burrowing, nesting, and overwintering.

The fourth primary constituent element of desert tortoise critical habitat is burrows, caliche caves, and other shelter sites. Installation is likely to destroy burrows, if any are present in the work sites. Because of the small areas to be disturbed and the proximity of the work areas to an active road, we expect that few burrows would likely be affected. We expect that, given the habitat that the transmission line traverses and the nature of the work, caliche caves would not be affected. We have reached this conclusion because these caves generally occur in the banks of washes or other areas of steeper terrain; we expect that, because SCE does not need large areas to conduct its work, it would avoid areas of more rugged terrain. We are unaware of any other type of shelter site in this area, other than under shrubs, which we have discussed elsewhere. Consequently, we expect that the installation of the fiber optic line would not have a measurable effect on burrows, caliche caves, and other shelter sites.

The fifth primary constituent element of desert tortoise critical habitat is sufficient vegetation for shelter from temperature extremes and predators. We expect that the installation of the fiber optic line would not have a measurable effect on vegetation that desert tortoises may use for shelter from temperature extremes and predators. We have reached this conclusion because of the small areas to be disturbed along the 32.79 miles of transmission line and the fact that relatively few shrubs would be removed.

The sixth primary constituent element is habitat protected from disturbance and human-caused mortality. Disturbance related the installation of the fiber optic line would be temporary; the human activity associated with installation of the fiber optic line would not measurably alter the amount of disturbance that currently occurs in the area. Consequently, we expect that the installation of the fiber optic line would not have a measurable effect on this primary constituent element.

As a result of considering how the proposed action would affect each of the primary constituent elements, we have determined that the proposed action is not likely to adversely affect critical habitat of the desert tortoise. If the proposed action changes in a manner that may affect critical habitat, the DOE or Bureau should contact us as soon as possible to determine whether further consultation would be appropriate.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Introduction

The proposed solar facility site is located north of Highway 58, approximately 9 miles west of Hinkley, southwest of Harper Dry Lake, and south of an existing solar facility, Harper Lake Solar Electric Generating Station (SEGS VIII and IX). Abengoa proposes to construct 2 approximately 800-acre solar fields (Alpha and Beta), using single-axis-tracking parabolic trough solar collectors. Each independent solar field would produce 125 megawatts. The solar field and its associated facilities, including the Lockhart substation, encompass 1,765 acres, and are considered to be the solar facility site.

To integrate the energy generated by the Mojave Solar facility as it enters the electrical grid, SCE would install fiber optic lines on existing transmission lines. Fiber optic lines would be installed within 4 existing utility rights-of way: between Lockhart and Tortilla substations (31 miles), between Lockhart and Kramer substations (16.39 miles), and between Kramer and Victor substations (37.89 miles). The connection between Lockhart and Tortilla would require a new right-of way to be established from Lockhart to Hinkley, although transmission lines are already present along the route. We summarized the description of the proposed action from the biological assessment (AECOM 2010) and the staff assessment (CEC 2010a).

Construction of Mojave Solar Facility

Construction of the Mojave Solar facility would occur over approximately 26 months (AECOM 2010) and require a workforce of 830 to 1,162 people (CEC 2010a). Access to the facility during construction and operation would be via Harper Lake Road off of State Route 58. Although the majority of Harper Lake Road is lined with desert tortoise exclusion fencing, some private lands and the intersections with utility crossings are not fenced. To reduce the amount of vehicle traffic along Harper Lake Road, Abengoa intends to use a bussing service from Barstow. With the exception of construction traffic along Harper Lake Road, all solar facility site construction would occur within desert tortoise exclusion fencing. The entire solar facility site, 1,765 acres, would be graded. Construction of the Alpha and Beta sites would include the installation of the parabolic trough solar collectors, a power block, an evaporation pond, and ancillary facilities. Additional components of the solar facility would include a natural gas pipeline, an onsite transmission and interconnection facility (Lockhart substation) on the Beta site, and a series of drainage channels. Additional details describing the construction elements for the solar facility can be found in the biological assessment (AECOM 2010).

Operation and Maintenance of Mojave Solar Facility

The biological assessment states that the Mojave Solar facility has operating life of 32.25 years to include operation and construction. During operation and maintenance, facility workers would travel Harper Lake Road to access the project site. Operation and maintenance activities for the solar facility would be conducted within the fenced solar facility. However, in the event that the perimeter fence needed repair (including clearing vegetation from the fenced drainage channel), fence repair work could require vehicles and equipment to work outside the Mojave Solar facility fencing.

Decommissioning and Restoration of Mojave Solar Facility

Prior to decommissioning, Abengoa would develop a decommissioning plan specifying how closure procedures would be developed and implemented. Project decommissioning would be performed in accordance with all other plans, permits, and mitigation measures that would assure the project conforms to applicable requirements and would avoid significant adverse impacts (CEC 2010b). At that time, if a Federal agency is involved with decommissioning, it would determine if decommissioning requires additional consultation, pursuant to section 7(a)(2) of the Endangered Species Act. If a Federal agency would not be involved with decommissioning and desert tortoises were likely to be killed by associated activities, we would recommend that Abengoa (or the current operator) apply for a permit under the authorities of section 10(a)(1)(B) of the Act. Consequently, we will not analyze the potential effects of decommissioning and associated restoration on the desert tortoise at this time.

Installation, Maintenance, and Operation of Fiber Optic Lines

To allow for the installation of the fiber optic lines, the Bureau would modify four existing right-of-way grants and establish one new grant.

Generally, the fiber optic lines would be installed on existing poles. Replacement poles would be accessed from existing roads or previously disturbed areas and would result in 4,500 square feet of disturbance per pole. Pulling and splice sites to install the lines would result in 4,800 square feet of disturbance per site and installation of fiber optic cable hardware would result in 280 square feet of disturbance. Additional details describing the installation of the fiber optic lines can be found in the biological assessment (AECOM 2010). The following table provides information on the fiber optic lines.

The following table summarizes the construction activities that would occur along each route and the amount of desert tortoise habitat that would be affected. Because SCE does not know the precise location of the disturbance associated with placement of the poles, the potentially affected area represents a maximum estimate.

Route	Feature	Impact (acres)
Lockhart to Tortilla 31 miles (3 right-of-way grants)	3 replacement poles (accessed from existing roads or other previously disturbed areas)	0.31
	access road - 8 feet wide by 6,100 feet long (through recovering vegetation)	1.12
	access road - 8 feet wide by 5 miles long (through recovering vegetation)	4.85
	32 pulling and splicing sites	3.53
	segments in underground conduits – 2; 400 feet at Harper Lake Road and 500 feet west of Tortilla substation	
Subtotal		9.81
Lockhart to Kramer 16.39 miles	4 replacement poles (accessed from existing disturbed areas)	0.41
	13 pulling and splicing sites	1.43
Subtotal		1.84
Kramer to Victor 37.98 miles	30 new poles between existing poles	7.75
	201 installation sites – fiber optic cable hardware onto poles	1.29
	22 pulling and splicing sites	2.42
Subtotal		11.46
TOTAL		23.11

In 1995, the Service issued a biological opinion to SCE that addressed the effects of the operation and maintenance of its transmission and distribution lines in the California desert (Service 1995a). The effects of operating and maintaining the proposed fiber optic lines would be the same as those analyzed in the 1995 biological opinion. Therefore, we will not discuss these activities and their effects any further in this biological opinion.

Minimization Measures

General Protective Measures

To minimize adverse effects to the desert tortoise, Abengoa and SCE will implement the following protective measures during construction, operation, and maintenance activities. We have changed the wording of some measures identified in the biological assessment and translocation plan, but we have not changed the substance of the measures that Abengoa and SCE have proposed.

1. Abengoa and SCE will assign a designated biologist to the project that meets the criteria of a desert tortoise authorized biologist as described by the Service. (Throughout this biological opinion, ‘authorized biologist’ refers to an authorized biologist with regard to the desert tortoise.)
2. Abengoa and SCE will employ authorized biologists, approved by the Bureau, Service, CEC and California Department of Fish and Game (CDFG), and desert tortoise monitors to ensure compliance with protective measures for the desert tortoise. Use of authorized biologists and desert tortoise monitors will be in accordance with the most up-to-date Service guidance and will be required for monitoring of any construction, operation, or maintenance activities that may result in adverse effects to the desert tortoise. The current guidance is entitled *Desert Tortoise – Authorized Biologist and Monitor Responsibilities and Qualifications* (Service 2008a).
3. Abengoa and SCE will provide the credentials of all individuals seeking approval as authorized biologists to the DOE, Bureau, Service, CEC and CDFG. (A qualifications statement for authorized biologists and an authorized biologist request form are located on our website (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/); please use these forms to fully understand the qualifications we are seeking for authorized biologists and to request our approval of these biologists.)
4. Abengoa and SCE will use authorized biologists for the performance of clearance surveys and for any other activities that require the handling of desert tortoises. If Abengoa uses desert tortoise monitors during clearance surveys or for other activities that require identification of sign or handling of desert tortoises, they will do so under the direct supervision of an authorized biologist.
5. Abengoa and SCE will designate a field contact representative who will oversee compliance with protective measures during construction, operation, and maintenance activities that may result in injury or mortality of desert tortoises. If the field contact representative, authorized biologist, or desert tortoise monitor identifies a violation of the desert tortoise protective measures, they will halt work until the violation is corrected.

6. Abengoa and SCE will develop and implement a worker environmental awareness program. The worker environmental awareness program will be administered to all project employees, as well as employees of contractors and subcontractors, who work on the project site or any related facilities during site mobilization, ground disturbance, grading, construction, operation, and closure. The worker environmental awareness program will include, but is not limited to, the following:
 - a) a presentation in which supporting written material and electronic media are made available to all participants;
 - b) a discussion of the locations and types of sensitive biological resources on the project site and adjacent areas;
 - c) a discussion of penalties for violation of applicable laws, ordinances, regulations, and standards (i.e., Federal and State Endangered Species Acts); and
 - d) identification of a contact if workers have further comments and questions about the material discussed in the program.

7. Abengoa and SCE will develop and implement a Biological Resources Mitigation Implementation and Monitoring Plan and submit copies of the proposed plan to the Service, Bureau and CDFG for review and comment. A copy of the Biological Resources Mitigation Implementation and Monitoring Plan will be kept on site and made readily available to biologists, regulatory agencies, the project owner, contractors, and subcontractors, as needed. The plan will identify:
 - a) All biological resource mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;
 - b) All biological resource conditions of certification identified as necessary to avoid or mitigate impacts;
 - c) All biological resource mitigation, monitoring, and compliance measures required in Federal agency terms and conditions, such as those provided in the biological opinion;
 - d) All biological resource mitigation, monitoring, and compliance measures required in local agency permits, such as site grading and landscaping requirements;
 - e) All sensitive biological resources to be affected, avoided, or mitigated by project construction, operation, and closure;

- f) All required mitigation measures for each sensitive biological resource;
 - g) All locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction; and
 - h) Duration for each type of monitoring and a description of monitoring methodologies and frequency.
8. Abengoa and SCE will ensure that the boundaries of all areas to be temporarily or permanently disturbed (including staging areas, access roads, and sites for temporary placement of spoils) will be delineated with stakes and flagging prior to construction activities in consultation with the designated biologist. Spoils will be stockpiled in disturbed areas, which do not provide habitat for special-status species. Parking areas, staging and disposal site locations will similarly be located in areas without native vegetation or special-status species habitat. All disturbances, vehicles, and equipment will be confined to the flagged areas.
 9. Abengoa and SCE will not extend any new and existing roads planned for construction, widening, or other improvements outside the flagged impact area. All vehicles passing or turning around will do so within the planned impact area or in previously disturbed areas. Where new access is required outside of existing roads (e.g., new spur roads) or the construction zone, the route will be clearly marked (i.e., flagged and/or staked) prior to the onset of construction.
 10. Abengoa and SCE will confine vehicular traffic during project construction and operation to existing routes of travel to and from the project site and cross-country vehicle and equipment use outside designated work areas will be prohibited. The speed limit will not exceed 25 miles per hour on Harper Lake Road and within fenced areas that have been cleared of desert tortoises and other wildlife. The speed limit will be 15 miles per hour within unfenced areas and secondary unpaved access roads.
 11. During construction, Abengoa and SCE will ensure that an authorized biologist is present during all activities that have the potential to disturb soil, vegetation, and wildlife. The authorized biologist will closely monitor vegetation removal and grading activities to prevent injury or mortality of desert tortoises.
 12. Abengoa will use staging areas for construction on the solar facility site within the area that has been previous cleared of desert tortoises and fenced to exclude desert tortoises. Temporary disturbance areas, if necessary, will occur within the solar facility site and will be designed, installed, and maintained with the goal of minimizing disturbance.
 13. Abengoa and SCE will use road surfacing and sealants and soil bonding and weighting agents that are not toxic to wildlife and plants on unpaved surfaces.

14. Facility lighting will be designed, installed, and maintained to prevent side casting of light toward the solar facility boundaries and the Harper Dry Lake marsh. Lighting will be shielded, directional, and at the lowest intensity required for activity.
15. Parking and storage will occur within desert tortoise exclusion fencing to the extent feasible. No vehicles or construction equipment parked outside the fenced area will be moved prior to an inspection of the ground beneath the vehicle for the presence of desert tortoises.
16. During construction, an authorized biologist will drive along project access roads, particularly Harper Lake Road, at least every 3 hours during the active period (April through May and September through October) looking for desert tortoises or other vulnerable wildlife within the roadway. Outside of the active period, roads will be monitored at least twice a day in advance of peak morning and evening traffic periods. During operation, employees will report any desert tortoise sightings along roadways to the authorized biologist. If a desert tortoise is observed in the roadway or beneath a parked vehicle, it will be left to move on its own or an authorized biologist may remove and transfer the animal to a safe location as identified in the translocation plan (Karl 2011).
17. During construction, at the end of each workday, all potential desert tortoise pitfalls (trenches, bores, and other excavations) outside the permanently fenced area will be backfilled. If backfilling is not feasible, all trenches, bores, and other excavations will be sloped at a 3:1 ratio at the ends to provide wildlife escape ramps, covered completely to prevent wildlife access, or fully enclosed with temporary desert tortoise exclusion fencing. All trenches, bores, and other excavations outside the areas permanently fenced with desert tortoise exclusion fencing will be inspected at the beginning of each day, periodically throughout, and at the end of each workday by authorized biologist. If a desert tortoise is found trapped, an authorized biologist will remove and relocate it to a safe location.
18. Abengoa and SCE will inspect any construction pipe, culvert, or similar structure with a diameter greater than 3 inches, stored less than 8 inches above the ground for one or more days/nights for wildlife before the material is moved, buried, or capped. As an alternative, all such structures may be capped before being stored or placed on pipe racks.
19. Abengoa and SCE will ensure that all inadvertent deaths of sensitive species are reported to the appropriate project representative, including road kill. Species name, physical characteristics of the animal (sex, age class, length, weight), and other pertinent information will be noted and reported in the monthly compliance reports. Injured animals will be reported to the Service, CDFG, and Bureau (when applicable) and the project owner will follow instructions provided by the wildlife agencies. If the wildlife agencies cannot be immediately reached, consideration will be given to taking the animal to a veterinary hospital.

20. Abengoa and SCE will prevent the formation of puddles when applying water to dirt roads and construction areas (trenches or spoil piles) for dust abatement. A monitor will patrol these areas to ensure water does not puddle and attract desert tortoises, common ravens (*Corvus corax*), and other wildlife to the site and will take appropriate action to reduce water application where necessary.
21. All vehicles and/or equipment will be maintained in good working condition and will be repaired if there is evidence of leaking motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The project hazardous materials plan will address proper procedures in the event of spills. Hazardous spills will be immediately cleaned up and will be disposed of at an authorized facility. Servicing of construction equipment will take place only at a designated area. Service/maintenance vehicles will carry a bucket and pads to absorb leaks and spills.
22. With the exception of security personnel, Abengoa and SCE will prohibit firearms on the project site.
23. If ground-disturbing activities are required prior to site mobilization, such as for geotechnical borings or hazardous waste evaluations, an authorized biologist will be present to monitor any action that could disturb soil, vegetation, or wildlife.
24. Prior to any ground-disturbing activities on the solar facility site, Abengoa will fence the area with desert tortoise exclusion fence, either temporary or permanent, and conduct clearance surveys following Service guidelines (2009a). The exclusion fencing will follow the specifications provided in the *Desert Tortoise Field Manual* (Service 2009a). We have provided a description of the procedures for clearance, translocation, and monitoring of these animals below. Workers will perform all ground-disturbing activities in areas fenced with exclusion fence on the solar facility site.
25. To avoid impacts to desert tortoises during fence construction, the proposed fence alignment will be flagged and the alignment surveyed within 24 hours prior to fence construction. Surveys will be conducted by an authorized biologist and will provide 100 percent coverage of all areas to be disturbed during fence construction; additional transects will be surveyed along both sides of the proposed fence line. These fence line transects will cover an area approximately 90 feet wide centered on the fence alignment using 15-foot-wide transects. All desert tortoise burrows and burrows constructed by other species that might be used by desert tortoises will be examined to assess occupancy of each burrow by desert tortoises and processed in accordance with the Service's current guidelines (Service 2009a).
26. Abengoa will install desert tortoise exclusion fencing at the headwalls, outlet, and road crossings of the onsite storm water drainage channels.

27. Security gates will be installed at the solar facility entrances and Abengoa will ensure that the gates remain closed except when vehicles enter or exit the facility. The gates will be designed with minimal ground clearance to deter ingress by desert tortoises. The gates may be electronically activated to open and close immediately after vehicle(s) have entered or exited to prevent extended periods with open gates, which might lead to a desert tortoise entering.
28. Following installation of the desert tortoise exclusion fencing for the solar facility site and storm water drainage channels, the fencing will be regularly inspected. Permanent fencing will be inspected monthly and during or immediately following all major rainfall events. Any damage to the fencing will be temporarily repaired immediately to keep desert tortoises out of the site and permanently repaired within 2 days of observing damage. Inspections of permanent site fencing will occur for the life of the solar facility. Temporary fencing will be inspected immediately following major rainfall events. All temporary fencing will be repaired immediately upon discovery and, if the fence may have permitted entry of desert tortoises while damaged, an authorized biologist will inspect the area enclosed by the fence for desert tortoises. A major rainfall event is defined as one for which soil and water flow through washes or overland that could damage the fence or erode the soil underneath.

Management of Common Ravens

Abengoa and SCE will implement the following project design features and protective measures to reduce the adverse effects associated with predation of desert tortoises by common ravens. The draft management plan for common ravens (AECOM 2009) contains more detailed information on the following actions related to Abengoa's solar facility.

1. Abengoa and SCE will dispose of all trash and food-related waste associated with the project in secure, self-closing receptacles to prevent the introduction of subsidized food resources for common ravens.
2. Abengoa will remove and dispose of all road-killed animals on the project site or its access roads.
3. Abengoa will use water for construction, operation, and maintenance (e.g., truck washing, dust suppression, landscaping, etc.) in a manner that does not result in puddling.
4. Abengoa will monitor the evaporation ponds on site for common raven use according to the approved Abengoa solar evaporation pond design monitoring and management plan and common raven management plan.
5. Abengoa will monitor the Mojave Solar facility to identify frequently used perching locations for common ravens. If it identifies such locations, Abengoa will use physical, auditory or visual bird deterrents to discourage use by common ravens.

6. Abengoa will conduct annual breeding season monitoring for common ravens to identify any nesting common ravens on the project facility for the life of the project.
7. Abengoa will remove inactive common raven nests from project structures on lands controlled by Abengoa. SCE will address common raven nests according to its existing migratory bird special purpose permit (MB728480-1, expires 3/31/2012).
8. Abengoa will notify the Service within 24 hours if problem common ravens are found on the project site. Problem common ravens are individuals that have been shown, through monitoring, to prey on desert tortoises.
9. Abengoa will monitor the effectiveness of its management plan at reducing subsidies for common ravens during construction and for 2 years following completion of the project. After this initial period, Abengoa will conduct monitoring once every 5 years, unless results indicate more or less frequent monitoring is necessary.
10. Abengoa will develop and implement adaptive management measures if monitoring shows that the management plan is not effective in controlling common raven use of the project site. Abengoa will consult with the Service, CEC, and CDFG prior to implementing adaptive management changes.

To address indirect and cumulative effects that it cannot fully eliminate through implementation of an onsite common raven management plan, Abengoa and SCE will contribute \$105 per acre of land permanently disturbed by this project to the regional common raven management program. The funds will be placed in an account established with the National Fish and Wildlife Foundation to implement recommendations in the Service's (2008b) environmental assessment for management of common ravens. This environmental assessment identifies several activities to reduce common raven predation on desert tortoises, including reduction of human-provided subsidies (e.g., food, water, sheltering and nesting sites), education and outreach, the removal of common ravens and their nests, evaluation of effectiveness, and adaptive management.

Weed Management

Abengoa and SCE will implement the following measures during construction and operation to prevent the spread and propagation of noxious weeds.

1. Abengoa and SCE will limit the size of any vegetation and ground disturbance to the absolute minimum and limit ingress and egress to defined routes.
2. Abengoa and SCE will apply soil stabilization and/or re-vegetation treatments as appropriate to disturbed sites and temporarily disturbed areas.
3. During all construction activities, Abengoa and SCE will prevent the spread of non-native plants via vehicular sources by implementing Trackclean™ (a tire cleaner

designed to dislodge material from tire treads) or other methods of vehicle cleaning for vehicles coming and going from construction sites. Earth-moving equipment and construction vehicles will be cleaned within an approved area or commercial facility prior to transport to the construction site. The number of cleaning stations will be limited and weed control and herbicide application will be used at the cleaning station(s).

4. Abengoa and SCE will use only weed-free straw, hay bales, and seed, or other similar items, for erosion control and sediment barrier installations.
5. Abengoa and SCE will ensure that invasive non-native species are not used in landscaping plans and erosion control.
6. Abengoa and SCE will monitor and implement control measures to ensure early detection and eradication of weed invasions.

Protective Measures Specific to the SCE Fiber Optic Line Installation

In addition to general measures outlined previously in this biological opinion, all personnel involved in the construction of the fiber optic cable installations will adhere to the following measures.

1. SCE will use Service-approved authorized biologists to conduct preconstruction clearance surveys for desert tortoises within the limits of the proposed work activity associated with the fiber optic cable installations.
2. Vehicular traffic during construction will be confined to existing routes of travel to and from the project site, and cross-country vehicle and equipment use outside designated work areas will be prohibited. Where new access is required outside of existing roads (e.g., new spur roads) or the construction zone, the route will be clearly marked (i.e., flagged and/or staked) prior to the onset of construction. The speed limit will be 15 miles per hour within unfenced areas and secondary unpaved access roads. Personnel will check under parked vehicles prior to moving the vehicle. If a desert tortoise is found under a vehicle and does not leave on its own, an authorized biologist can be called to move the animal out of harm's way, no more than 500 meters from its original location.

(Throughout this biological opinion, "moving desert tortoises from harm's way" refers to moving the desert tortoise the minimum distance necessary to place it in a safe location, within its home range. Moving desert tortoise from harm's way will only occur on linear portions of the project. All other movements involve translocation of desert tortoises; these movements will only occur with desert tortoises found within the solar facility site.)

3. In construction areas in potentially occupied desert tortoise habitat, work and staging areas, including the locations of the fiber optic lines under construction, may be fenced with Service-approved temporary desert tortoise exclusion fencing in a manner that

prevents equipment and vehicles from straying from the designated work area into adjacent habitat. An authorized biologist will assist in determining the boundaries of the area to be fenced in consultation with the Service and CDFG, and with the Bureau when construction areas are within lands administered by the Bureau.

4. An authorized biologist will be onsite to address any desert tortoises found inside fenced areas that are not fully graded. When active construction occurs outside of desert tortoise exclusion fencing, monitoring will be continuous.
5. All workers will be advised that equipment and vehicles must remain within the fenced work areas. Installation of the fencing and any necessary surveys will be directed or conducted by an authorized biologist. The fencing will remain in place for the duration of construction activities at a particular location and will be removed when construction activities are complete.
6. A desert tortoise authorized biologist will inspect the fencing on a biweekly basis to ensure that no holes develop that could allow desert tortoises to enter the work areas. If holes are found, they will be repaired immediately.
7. If a desert tortoise is found within an area that has been fenced to exclude them, activities will cease until an authorized biologist moves it out of harm's way outside of the fence, no greater than 500 meters away from its original location. At this time, the fencing will be inspected for holes.
8. If a desert tortoise is found in a construction area where fencing was deemed unnecessary, it will be moved in the manner described in the translocation plan (Karl 2011). Any desert tortoises found during clearance surveys will be moved in the manner identified in the translocation plan (Karl 2011).
9. Authorized biologists will follow the Service's current desert tortoise handling guidelines at all times (currently Service 2009a).
10. SCE will restrict work to daylight hours, except during an emergency, to avoid nighttime activities when desert tortoises may be present on the access road unless otherwise approved in advance by the Bureau and CDFG.
11. SCE will only use seed from locally occurring species when rehabilitating and restoring temporarily disturbed areas. Seeds will contain a mix of short-lived early pioneer species, such as native annuals and perennials and subshrubs. Seeding will be conducted as described in chapter 5 of Newton and Claassen (2003).

*Desert Tortoise Translocation*Fencing and Clearance Surveys of the Mojave Solar Facility

Abengoa will install desert tortoise exclusion fencing following specifications in the *Desert Tortoise Field Manual* (Service 2009a) prior to any construction activities on the solar facility site. The permanent fence around the solar facility will also include the drainage channel. The desert tortoise exclusion fence will be attached to the Mojave Solar facility permanent perimeter fence. Temporary fencing may be used to exclude desert tortoises until the permanent fence is installed. Temporary fencing will follow guidelines and materials for permanent fencing except in very temporary situations, when silt fencing may be used. In both cases, supporting stakes will be sufficiently spaced (e.g., ≤ 8 feet for wire mesh; ≤ 5 feet for silt fencing) to maintain fence integrity. Fencing may be buried if it would not create a biologically significant disturbance or bent outward at the ground level with the bent portion tacked or held down by rocks and soil.

Within 24 hours prior to fence installation, authorized biologists will survey the staked fence-line for all desert tortoises and their burrows, covering a swath of at least 90 feet centered on the fence-line, using 15-foot-wide transects. Desert tortoise burrows will be flagged and mapped using Global Positioning System and the size and occupancy recorded. If possible, burrows will be avoided. Unoccupied burrows that cannot be avoided will be collapsed following standardized techniques (Service 2009a). If the burrow is occupied by a desert tortoise, it will be avoided and the burrow fenced with high visibility fencing. The burrow and fence will be continually monitored while construction proceeds in the immediate area of the burrow and once all danger of construction has passed, the fencing will be removed.

At a minimum, one desert tortoise monitor will accompany each separate fence construction team, such that no driving, trenching, fence pulling, or any surface disturbing activities will occur without the immediate presence of a desert tortoise monitor. Maps of burrows from the preconstruction survey will be provided to all monitors.

During fence construction, desert tortoises will be avoided if at all possible. Fence gaps and temporary fencing will be used to allow desert tortoises to leave the project site. Any desert tortoises that must be moved during perimeter fencing will be fitted with a transmitter and moved immediately outside the construction zone, following the procedures outlined in Abengoa's translocation plan (Karl 2011).

Following installation of the desert tortoise exclusion fencing, both permanent and temporary, the fencing will be regularly inspected. If the exclusion fence is installed during the desert tortoise active season, the fencing will be inspected at least two times a day to determine if any desert tortoises are walking along the inside of the fence.

Abengoa will conduct a minimum of three clearance surveys of the Mojave Solar facility site following Service guidelines (2009a). Abengoa will consider the solar facility site cleared of desert tortoises when no desert tortoises are located during two consecutive clearance passes. If

a desert tortoise is found on one of the final passes, Abengoa will continue to conduct clearance surveys until two passes have been made during which no new desert tortoises are found.

Abengoa will map and evaluate all desert tortoise sign during each clearance pass and collect all scat located. During subsequent passes, Abengoa will conduct concentrated searches in areas where fresh scat is found. After the second pass, concentrated searches will be conducted in all areas where recent sign is concentrated, unless a desert tortoise has been found in that area.

Abengoa will not collapse burrows until the third pass of clearance surveys. On the third pass, Abengoa will completely excavate burrows using standardized techniques approved by the Service (2009a). Abengoa will translocate any desert tortoise nests found during burrow excavation in the manner outlined in the translocation plan (Karl 2011).

Translocation – Mojave Solar Facility

Abengoa will follow the procedures outlined in the translocation plan for the proposed project (Karl 2011). An authorized biologist will move all desert tortoises found during clearance surveys safely from the solar facility site.

All desert tortoises determined to be appropriate for translocation (i.e., having good body condition and showing no sign of diseases such as upper respiratory tract disease, herpes virus, shell disease, or other diseases) will be marked with a unique identifier determined by the Desert Tortoise Recovery Office and released in a safe location underneath a shrub. If desert tortoises show signs of disease, they will be sent to the Desert Tortoise Conservation Center after coordinating with the Service. Prior to translocation, Abengoa will ensure that all desert tortoises receive a visual health assessment to verify that each individual does not show signs of disease. Desert tortoises translocated a distance greater than 500 meters will be tested for disease (i.e., enzyme-linked immunosorbent assay [ELISA] test) via blood sampling. Any desert tortoises moved less than 500 meters will not require a blood sample as part of the health assessment. Abengoa will not translocate desert tortoises outside of the recommended temperature guidelines or outside of the desert tortoise active season (generally between April 1 and May 31). Abengoa will maintain a record of all desert tortoises encountered and translocated during project surveys and monitoring.

All desert tortoises translocated from the Mojave Solar facility site will be measured, weighed, and affixed with a transmitter at the time of initial capture. Following processing, if the subadult or adult desert tortoise is within 500 meters of suitable desert tortoise habitat outside of the solar facility boundary, Abengoa will place the individual in the shade of a shrub or at the mouth of a burrow and begin monitoring as described below. Subadult and adult desert tortoises that are found greater than 500 meters from suitable desert tortoise habitat outside of the solar facility site will be released at the capture site after being processed and fitted with a transmitter. Abengoa will monitor these desert tortoises daily for one week to determine if the desert tortoise moves to an area within 500 meters of suitable habitat outside of the project boundary, indicating an area with which the desert tortoise is familiar. If the desert tortoise demonstrates familiarity

(e.g., burrows, fence walks, or spends the majority of their time) with an area within 500 meters of suitable desert tortoise habitat outside of the solar facility boundary, Abengoa will translocate the desert tortoise as described above. If, during the week of monitoring, the desert tortoise remains greater than 500 meters from suitable desert tortoise habitat outside the solar facility boundary, the desert tortoise will be placed in an individual quarantine pen within the translocation area.

Abengoa will translocate juvenile desert tortoises (carapace length less than 110 millimeters) found within 100 meters of suitable desert tortoise habitat outside the solar facility boundary, in the same manner as subadult and adult desert tortoises found within 500 meters of suitable habitat. Juvenile desert tortoises found greater than 100 meters from suitable desert tortoise habitat outside the solar facility boundary will be moved into predator-proof enclosures described in the translocation plan (Karl 2011). After 2 weeks, Abengoa will create escape holes at the lower edge of the enclosures and the juvenile desert tortoises will be allowed to leave on their own.

To minimize the potential adverse effects of disease, Abengoa will perform visual health assessments on all desert tortoises located within 1.5 kilometers of a desert tortoise translocated less than 500 meters; Abengoa will perform visual health assessments and ELISA testing on all desert tortoises located within 6.5 kilometers of a desert tortoise translocated greater than 500 meters. Desert tortoises in the recipient areas receiving ELISA testing will be fitted with a transmitter so that the individuals can be identified and relocated after test results are received. Following the determination of the individual's health, the transmitter will be removed. Abengoa will not translocate any desert tortoises from the project site to a location within 1.5 and 6.5 kilometers (for translocations less than and greater than 500 meters, respectively) of a resident desert tortoise showing either clinical signs of disease or with a blood test result indicating that the individual is seropositive.

Monitoring - Mojave Solar Facility

Abengoa will attach transmitters to and monitor all desert tortoises cleared from the Mojave Solar facility site that are of sufficient size to accommodate transmitters. Smaller animals (i.e., those that do not receive transmitters) will be blood tested (when being moved greater than 500 meters) and translocated without transmitters if found to be in good health. Abengoa will collect blood samples on the resident subadults and adults located in the recipient areas receiving desert tortoises from more than 500 meters away. If five or more desert tortoises are found within the Mojave Solar facility site, Abengoa will work with the Service, CEC, CDFG, and Bureau to determine appropriate resident and control animals for monitoring. (We will not consider the potential effects of these activities on resident and control animals in this biological opinion; if more than four desert tortoises are found on the proposed solar site, re-initiation of formal consultation would likely be appropriate.) Abengoa will use qualified biologists, authorized by the Service, CEC, and CDFG, to monitor all desert tortoises associated with the project translocation plan.

During monitoring, Abengoa will collect information on survivorship, mortality rates, health status, body condition, movement of individuals, and predation to inform adaptive management. Abengoa will monitor the translocated for a minimum of 5 years, unless a shorter duration is approved by the Service. Abengoa has provided a more detailed description of the monitoring program in its translocation plan (Karl 2011). Following more intensive monitoring immediately after translocation, locations for individuals will be collected at a minimum of once per week from March to November and once every other week from November to February.

Translocation - SCE Fiber Optic Lines

SCE will not translocate any desert tortoises in association with the installation of the fiber optic lines. SCE will move from harm's way any desert tortoises found within the construction area. SCE will place desert tortoises as close as possible to the capture point immediately outside the construction zone under the shade of a shrub in suitable desert tortoise habitat. SCE will not move desert tortoises more than 500 meters. SCE will use qualified biologists, authorized by the Service, Bureau, and CDFG to handle any desert tortoises that must be moved from harm's way during the installation of the fiber optic lines.

Mojave Solar Project Minimization Measures

To minimize adverse effects to the desert tortoises, Abengoa and SCE will implement the following protective measures when implementing clearance surveys, translocation, and monitoring:

1. Abengoa will use authorized biologists with additional qualifications approved by the Service for attaching transmitters and collecting blood samples.
2. Following clearance of the fenced solar facility, an authorized biologist will be onsite during initial clearing and grading to move any desert tortoises missed during the clearance surveys. Following initial clearing and grading, an authorized biologist will be on-call during construction, should a desert tortoise be located inside the project construction site.
3. An authorized biologist will hydrate all desert tortoises scheduled for translocation within 12 hours prior to release in accordance with the translocation plan.
4. Abengoa will only use Service-authorized individuals that have experience identifying the clinical signs of upper respiratory tract disease, herpes virus, and cutaneous dyskeratosis for the performance of health assessments. Abengoa will provide the Service with the qualifications of any authorized biologists that it will use to perform health assessments on desert tortoises during clearance and translocation activities.
5. The number of desert tortoises translocated into translocation areas greater than 500 meters will not exceed the Service-recommended (2010b) 130 percent over the mean

density of desert tortoises in the Western Mojave Recovery Unit, as determined by line-distance sampling.

Compensation

Abengoa will provide approximately 118.2 and 88.6 acres of desert tortoise habitat to compensate for impacts associated with the construction of Mojave Solar facility site and the installation of the fiber optics lines, respectively. The actual acres of compensation associated with the installation of the fiber optic lines will be determined following the completion of the project, and will be based on the actual amount of acres disturbed. The lands will be preserved and managed in perpetuity for the benefit of the desert tortoise, pursuant to a conservation easement to be deeded to CDFG or to a third-party entity (such as the Bureau) approved by CDFG and CEC. The Bureau, CDFG, and CEC are working with Abengoa to identify the compensation lands and the total amount of desert tortoise habitat that will be preserved. The acquisition of these lands will promote the conservation of the desert tortoise to a minor degree; we will not discuss compensation further in this biological opinion.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. “Jeopardize the continued existence of” means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of the species (50 Code of Federal Regulations 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which describes the range-wide condition of the desert tortoise, the factors responsible for that condition, and its survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of the desert tortoise in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the desert tortoise; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the desert tortoise; and (4) the Cumulative Effects, which evaluates the effects on the desert tortoise of future, non-Federal activities in the action area.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of the desert tortoise, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the desert tortoise in the wild. The jeopardy analysis in this biological opinion places an emphasis on consideration of the range-wide survival and recovery needs of the desert tortoise and the role of the action area in the survival and recovery of the desert tortoise as the

context for evaluation of the significance of the effects of the proposed federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

STATUS OF THE DESERT TORTOISE

Basic Ecology

The desert tortoise is a large, herbivorous reptile found in portions of the California, Arizona, Nevada, and Utah deserts. It also occurs in Sonora and Sinaloa, Mexico. In California, the desert tortoise occurs primarily within the creosote (*Larrea tridentata*), shadscale (*Atriplex confertifolia*), and Joshua tree (*Yucca brevifolia*) series of Mojave Desert scrub, and the Lower Colorado River Valley subdivision of Sonoran Desert scrub. Optimal habitat has been characterized as creosote bush scrub in areas where precipitation ranges from 2 to 8 inches, diversity of perennial plants is relatively high, and production of ephemerals is high (Luckenbach 1982, Turner and Brown 1982, Schamberger and Turner 1986). Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse. In California, desert tortoises are typically associated with gravelly flats or sandy soils with some clay, but are occasionally occur in windblown sand or in rocky terrain (Luckenbach 1982). Desert tortoises occur in the California desert from below sea level to an elevation of 7,300 feet, but the most favorable habitat occurs at elevations of approximately 1,000 feet to 3,000 feet (Luckenbach 1982, Schamberger and Turner 1986). Recent range-wide monitoring efforts have consistently documented desert tortoises above 3,000 feet (Service 2006a).

Desert tortoises may spend more time in washes than in flat areas outside of washes. Jennings (1997) notes that, between 1 March and 30 April, desert tortoises “spent a disproportionately longer time within hill and washlet strata” and, from 1 May through 31 May, hills, washlets, and washes “continued to be important.” Jennings’ paper does not differentiate between the time desert tortoises spent in hilly areas versus washes and washlets; however, he notes that, although washes and washlets comprised only 10.3 percent of the study area, more than 25 percent of the plant species on which desert tortoises fed were located in these areas. Luckenbach (1982) states that the “banks and berms of washes are preferred places for burrows.” He also recounts an incident in which a flash flood killed 15 desert tortoises along 0.12 miles of wash.

Desert tortoises are most active in California during the spring and early summer when annual plants are most common; because their behavior depends on numerous factors, such as temperatures, rainfall, and the size of the animal, we cannot provide definitive dates for when desert tortoises are likely to be active. Additional activity occurs during warmer fall months and occasionally after summer rainstorms. Desert tortoises spend most of their time during the remainder of the year in burrows, escaping the extreme conditions of the desert; however, recent work has demonstrated that they can be active at any time of the year. Further information on the range, biology, and ecology of the desert tortoise can be found in Burge (1978), Burge and Bradley (1976), Hovik and Hardenbrook (1989), Luckenbach (1982), Weinstein et al. (1987), and Service (1994).

Food resources for desert tortoises are dependent on the availability and nutritional quality of annual and perennial vegetation, that climatic factors, such as the timing and amount of rainfall, temperatures, and wind may influence (Beatley 1969 and 1974, Congdon 1989, Karasov 1989, Polis 1991 (all in Avery 1998)). In the Mojave Desert, these climatic factors are highly variable and this variability can limit the desert tortoise's food resources.

Desert tortoises will eat many species of plants. However, at any time, most of their diet consists of a few species (Nagy and Medica 1986, Jennings 1993 (all in Avery 1998)). Additionally, their preferences can change during the course of a season (Avery 1998) and over several seasons (Esque 1994 in Avery 1998). Possible reasons for desert tortoises to alter their preferences may include changes in nutrient concentrations in plant species, the availability of plants, and the nutrient requirements of individual animals (Avery 1998). In Avery's (1998) study in the Ivanpah Valley, desert tortoises consumed primarily green annual plants in spring and they ate cacti and herbaceous perennials once the winter annuals began to disappear. Medica et al. (1982 in Avery 1998) found that desert tortoises ate increased amounts of green perennial grass when winter annuals were sparse or unavailable. Avery (1998) also found that desert tortoises rarely ate perennial grasses.

Desert tortoises can produce from one to three clutches of eggs per year. On rare occasions, clutches can contain up to 15 eggs. Most clutches contain three to seven eggs. Multi-decade studies of the Blanding's turtle (*Emydoidea blandingii*), that, like the desert tortoise, is long lived and matures late, indicate that approximately 70 percent of the young animals must survive each year until they reach adult size. After this time, annual survivorship exceeds 90 percent (Congdon et al. 1993). Research has indicated that 50 to 60 percent of young desert tortoises typically survive from year to year, even in the first and most vulnerable year of life. We do not have sufficient information on the demography of the desert tortoise to determine whether this rate is sufficient to maintain viable populations; however, it does indicate that maintaining favorable habitat conditions for small desert tortoises is crucial for the continued viability of the species.

Desert tortoises typically hatch from late August through early October. At the time of hatching, the desert tortoise has a substantial yolk sac. The yolk can sustain them through the fall and winter months until forage is available in the late winter or early spring; however, neonates will eat if food is available to them at the time of hatching. When food is available, they can reduce their reliance on the yolk sac to conserve this source of nutrition. Neonate desert tortoises use abandoned rodent burrows for daily and winter shelter. These burrows are often shallowly excavated and run parallel to the surface of the ground.

Neonate desert tortoises emerge from their winter burrows as early as late-January to take advantage of freshly germinating annual plants. If appropriate temperatures and rainfall are present, at least some plants will continue to germinate later in the spring. Freshly germinating plants and plant species that remain small throughout their phenological development are important to neonate desert tortoises because their size prohibits access to taller plants. As plants grow taller during the spring, some species become inaccessible to small desert tortoises.

Neonate and juvenile desert tortoises require approximately 12 to 16 percent protein content in their diet for proper growth. Both juvenile and adult desert tortoises seem to forage selectively for particular species of plants with favorable ratios of water, nitrogen (protein), and potassium. The potassium excretion potential model (Oftedal 2001) predicts that, at favorable ratios, the water and nitrogen allow desert tortoises to excrete high concentrations of potentially toxic potassium, which is abundant in many desert plants. Oftedal (2001) also reports that variation in rainfall and temperatures cause the potassium excretion potential index to change annually and during the course of a plant's growing season. Therefore, the changing nutritive quality of plants, combined with their increase in size, further limits the forage available to small desert tortoises to sustain their survival and growth.

In summary, the ecological requirements and behavior of neonate and juvenile desert tortoises are substantially different from those of subadults and adults. Smaller desert tortoises use abandoned rodent burrows, which are typically more fragile than the larger ones constructed by adults, they are active earlier in the season, and small desert tortoises rely on smaller annual plants with greater protein content. The smaller plant size allows them to gain access to food and the higher protein content promotes growth.

Recovery Plan

The recovery plan for the desert tortoise is the basis and key strategy for recovery and delisting of the desert tortoise. The recovery plan divides the range of the desert tortoise into 6 distinct population segments, or recovery units, and recommends the establishment of 14 desert wildlife management areas throughout the recovery units. Within each desert wildlife management area, the recovery plan recommends implementation of reserve level protection of desert tortoise populations and habitat, while maintaining and protecting other sensitive species and ecosystem functions. The recovery plan also recommends that desert wildlife management areas be designed to follow the accepted concepts of reserve design and be managed to restrict human activities that negatively affect desert tortoises (Service 1994). The delisting criteria established by the recovery plan are:

1. The population within a recovery unit must exhibit a statistically significant upward trend or remain stationary for at least 25 years;
2. Enough habitat must be protected within a recovery unit or the habitat and desert tortoises must be managed intensively enough to ensure long-term viability;
3. Populations of desert tortoises within each recovery unit must be managed so discrete population growth rates (λ s) are maintained at or above 1.0;
4. Regulatory mechanisms or land management commitments that provide for long-term protection of desert tortoises and their habitat must be implemented; and

5. The population of the recovery unit is unlikely to need protection under the Endangered Species Act in the near future.

The recovery plan based its descriptions of the six recovery units on differences in genetics, morphology, behavior, ecology, and habitat use over the range of the Mojave population of the desert tortoise. The recovery plan contains generalized descriptions of the variations in habitat parameters of the recovery units and the behavior and ecology of the desert tortoises that reside in these areas (pages 20 to 22 in Service 1994). The recovery plan (pages 24 to 26 from Service 1994) describes the characteristics of desert tortoises and variances in their habitat, foods, burrow-sites, and phenotypes across the range of the listed taxon. Consequently, to capture the full range of phenotypes, use of habitat, and range of behavior of the desert tortoise as a species, conservation of the species across its entire range is essential.

The Service (2008c) has released a revised recovery plan for public review. The revised recovery plan includes a discussion of reducing the number of recovery units to four, based on information generated since the release of the original document. As of this time, we have not issued a final revised recovery plan.

Relationship of Recovery Units, Distinct Population Segments, Desert Wildlife Management Areas, and Critical Habitat Units

The recovery plan (Service 1994) recognized six recovery units or evolutionarily significant units across the range of the listed taxon, based on differences in genetics, morphology, behavior, ecology, and habitat use of the desert tortoises found in these areas. The boundaries between these areas are vague. In some cases, such as where the Western Mojave Recovery Unit borders the Eastern Mojave Recovery Unit, a long, low-lying, arid valley provides a substantial separation of recovery units. In other areas, such as where the Eastern Mojave Recovery Unit borders the Northern Colorado Recovery Unit, little natural separation exists. Over the years, workers have commonly referred to the areas as “recovery units;” the term “distinct population segment” has not been in common use.

The recovery plan recommended that land management agencies establish one or more desert wildlife management areas within each recovery unit. As mentioned previously in the Recovery Plan for the Desert Tortoise section of this biological opinion, the recovery plan recommended that these areas receive reserve-level management to remove or mitigate the effects of the human activities responsible for declines in the number of desert tortoises. As was the case for the recovery units, the recovery plan did not determine precise boundaries for the desert wildlife management areas. The recovery team intended for land management agencies to establish these boundaries, based on the site-specific needs of the desert tortoise. At this time, desert wildlife management areas have been established throughout the range of the desert tortoise.

Based on the recommendations contained in the draft of the original recovery plan for the desert tortoise, the Service designated critical habitat units throughout the range of the desert tortoise

(59 Federal Register 5820). The 14 critical habitat units have defined boundaries and cover specific areas throughout the 6 recovery units.

The Bureau used the boundaries of the critical habitat units and other considerations, such as conflicts in management objectives and more current information, to propose and designate desert wildlife management areas through its land use planning processes. In California, the Bureau also classified these desert wildlife management areas as areas of critical environmental concern, which allows the Bureau to establish management goals for specific resources in defined areas. Through the land use planning process, the Bureau established firm boundaries for the desert wildlife management areas.

Finally, we note that the Department of Defense installations and National Park Service units in the California desert did not establish desert wildlife management areas on their lands. Where the military mission is compatible with management of desert tortoises and their habitat, the Department of Defense has worked with the Service to conserve desert tortoises and their habitat. Examples of such overlap include the bombing ranges on the Navy’s Mojave B and the Chocolate Mountains Aerial Gunnery Ranges. Although the target areas are heavily disturbed, most of the surrounding land remains undisturbed. Additionally, the Army has established several areas along the boundaries of Fort Irwin where it prohibits training with vehicles. Desert tortoises persist in these areas, which are contiguous with lands off base. The National Park Service did not establish desert wildlife management areas within the Mojave National Preserve, because the entire preserve is managed at a level that is generally consistent with the spirit and intent of the recovery plan for the desert tortoise.

The following table depicts the relationship among recovery units, desert wildlife management areas, and critical habitat units through the range of the desert tortoise.

Critical Habitat Unit	Desert Wildlife Management Area	Recovery Unit	State	Size of Critical Habitat Unit (acres)
Chemehuevi	Chemehuevi	Northern Colorado	CA	937,400
Chuckwalla	Chuckwalla	Eastern Colorado	CA	1,020,600
Fremont-Kramer	Fremont-Kramer	Western Mojave	CA	518,000
Ivanpah Valley	Ivanpah Valley	Eastern Mojave/Northeastern Mojave	CA	632,400
Pinto Mountain	Joshua Tree	Western Mojave/ Eastern Colorado	CA	171,700
Ord-Rodman	Ord-Rodman	Western Mojave	CA	253,200
Piute-Eldorado-CA	Fenner	Eastern Mojave	CA	453,800
Piute-Eldorado-	Piute-Eldorado	Northeastern Mojave/ Eastern Mojave	NV	516,800

Critical Habitat Unit	Desert Wildlife Management Area	Recovery Unit	State	Size of Critical Habitat Unit (acres)
NV				
Superior-Cronese	Superior-Cronese Lakes	Western Mojave	CA	766,900
Beaver Dam: NV UT AZ	Beaver Dam Beaver Dam Beaver Dam	Northeastern Mojave (all)	NV UT AZ	87,400 74,500 42,700
Gold Butte-Pakoon NV AZ	Gold Butte-Pakoon Gold Butte-Pakoon	Northeastern Mojave (all)	NV AZ	192,300 296,000
Mormon Mesa	Mormon Mesa Coyote Spring	Northeastern Mojave	NV	427,900
Upper Virgin River	Upper Virgin River	Upper Virgin River	UT	54,600

Status

The Mojave population of the desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, southwestern Utah, and in the Colorado Desert in California. On August 4, 1989, the Service published an emergency rule listing the Mojave population of the desert tortoise as endangered (54 Federal Register 32326). In its final rule, dated April 2, 1990, the Service determined the Mojave population of the desert tortoise to be threatened (55 Federal Register 12178).

The Service listed the desert tortoise in response to loss and degradation of habitat caused by numerous human activities including urbanization, agricultural development, military training, recreational use, mining, and livestock grazing. The loss of individual desert tortoises to increased predation by common ravens, collection by humans for pets or consumption, collisions with vehicles on paved and unpaved roads, and mortality resulting from diseases also contributed to the Service's listing of this species.

Before entering into a discussion of the status and trends of the desert tortoise in the Western Mojave Recovery Unit where the proposed action is located, a brief discussion of the methods of estimating the numbers of desert tortoises would be useful. Three primary methods have been widely used: permanent study plots, triangular transects, and line-distance sampling. Generally, permanent study plots are areas visited at roughly four-year intervals to determine the numbers of desert tortoises present. Desert tortoises found on these plots during the initial spring surveys are registered. That is, individuals are marked for identification during subsequent surveys. Between 1971 and 1980, 27 plots were established in California to study the desert

tortoise. Berry (1999) monitored desert tortoises on fifteen of these plots on a long-term basis. Range-wide, 49 plots were used at one time or another to attempt to monitor desert tortoises (Tracy et al. 2004).

Triangular transects are used to detect sign (i.e., scat, burrows, footprints, etc.) of desert tortoises. The number of sign is then correlated with standard reference sites, such as permanent study plots, to allow the determination of density estimates.

Finally, line-distance sampling involves walking transects while trying to detect live desert tortoises. An estimation of density can be made by measuring the distance of the desert tortoise from the transect centerline, measuring the distance the desert tortoise is observed along the transect length, and calculating the percentage of animals in the area that were likely to be above ground and visible to surveyors during the time the transect was walked. This density is only represents an estimation of the number of desert tortoises that are greater than 180 millimeters in size. Desert tortoises that are larger than this size are typically classified as subadult or adult desert tortoises.

Each of these methods has various strengths and weaknesses. In general, permanent study plots are used to estimate the status of desert tortoises across large areas over time. Triangular transects were used to assess the density of desert tortoises on specific sites at a point in time. This method was commonly used to determine how many desert tortoises might be affected by a specific proposed action. In 2001, the Service initiated line-distance sampling to estimate the density of desert tortoises in desert wildlife management areas and critical habitat throughout their range.

Note that, when reviewing the information presented in the following sections, determining the number of desert tortoises over large areas is extremely difficult. The report prepared by the Desert Tortoise Recovery Plan Assessment Committee (Tracy et al. 2004) acknowledges this fact. Desert tortoises spend much of their lives underground or concealed under shrubs, are not very active in years of low rainfall, and are distributed over a wide area in several different types of habitat. Other factors, such as the inability to sample on private lands and rugged terrain, further complicate sampling efforts. Consequently, the topic of determining the best way to estimate the abundance of desert tortoises has generated many discussions over the years. Because of this difficulty, we cannot provide concise estimations of the density of desert tortoises in each recovery unit or desert wildlife management area in a consistent manner.

Given the difficulty in determining the density of desert tortoises over large areas, the reader needs to understand that the differences in density estimates in the recovery plan and those derived from subsequent sampling efforts may not accurately reflect on-the-ground conditions. Despite this statement, the reader should also be aware that the absence of live desert tortoises and the presence of carcasses over large areas of some desert wildlife management areas provide at least some evidence that desert tortoise populations seem to be in a downward trend in some regions.

The following paragraphs provide general information on the status and trends of the desert tortoise population in the Western Mojave Recovery Unit, where the proposed action is located. We have not included detailed information on the status of the desert tortoise in the other recovery units throughout the range of the species in this biological opinion. This omission will not compromise the analysis in the biological opinion because our determination regarding whether a proposed action is likely to jeopardize the continued existence of a species must be conducted at the level of the listed taxon. When the range of the listed taxon is divided into recovery units, our level of analysis begins with the recovery unit. If the effects of the proposed action have the potential to compromise the ability of the species to survive and recover within the recovery unit, the next level of analysis considers how the compromised recovery unit would affect the listed taxon throughout its range (Service 2005). Therefore, we conduct our analysis in a comprehensive manner through an iterative process. The Western Mojave Recovery Unit comprises one of six recovery units for the desert tortoise; consequently, our level of analysis in this biological opinion will begin at this level.

The Western Mojave Recovery Unit is located entirely in California, situated west of the Eastern Mojave, Northern Colorado, and Eastern Colorado Recovery Units. Four critical habitat units and four desert wildlife management areas are located within this recovery unit. Tracy et al. (2004) and Service (1994) note that densities on permanent study plots in various locations (Fremont Valley, Johnson Valley, Stoddard Valley, Fremont Peak, Kramer Hills, Lucerne Valley, and the Desert Tortoise Natural Area) across the Western Mojave Recovery Unit have shown a significant negative trend in adult densities over time.

In the Western Mojave Recovery Unit, desert tortoises generally occur from Olancho and the northern Panamint Valley in the north, to Joshua Tree National Park in the south, and from the lower foothills of the southern Sierra Nevada and Tehachapi Mountains in the west, and east to Death Valley and the eastern side of Joshua Tree National Park. Although desert tortoises were historically widespread in the western Mojave Desert, their distribution within this region was not uniform. For example, desert tortoises likely occurred at low densities in the juniper woodlands of the western Antelope Valley and in the sandier habitats in the Mojave River valley. Likely, they were also largely absent from the higher elevations of the area's mountains and from playas and the areas immediately surrounding these dry lakes.

The following paragraphs describe the status of the desert tortoise outside of desert wildlife management areas in the Western Mojave Recovery Unit. At the Fort Irwin Military Base, the Army conducts realistic, large-scale exercises with large numbers of wheeled and tracked vehicles. In areas where training has occurred for many decades, desert tortoises persist in relatively low numbers primarily on the steep, rugged slopes of the mountain ranges and in incised washes that occur throughout Fort Irwin. Desert tortoises persist here because vehicles generally do not use these areas. We do not have specific information on the numbers of desert tortoises in these areas. We expect that they will persist long into the future as small aggregations of animals that are likely isolated from desert tortoises in the remainder of the Western Mojave Recovery Unit. Some exchange may occur with desert tortoises in the South

Range portion for the Naval Air Weapons Station to the west of Fort Irwin, and a narrow strip of Bureau lands and Death Valley National Park to the north.

The Naval Air Weapons Station, China Lake, is divided into two large units. The southern unit lies to the west of Fort Irwin and north of the western expansion area, and the northern portion of the Naval Air Weapons Station lies to the northwest of the southern unit. The Department of the Navy (Navy) has designated approximately 200,000 acres of the South Range at the Naval Air Weapons Station, China Lake as a management area for the desert tortoise (Service 1995b). Through a consultation with the Service (1992a), the Navy agreed to try to direct most ground-disturbing activities outside of this area, to use previously disturbed areas for these activities when possible, and to implement measures to reduce the effects of any action on desert tortoises. This area also encompasses the Superior Valley Tactical Bombing Range located in the southernmost portion of the Mojave B South land management unit of the Naval Air Weapons Station. It is as an active bombing range for military test and training operations by the Navy and Department of Defense. In the three years for which we had annual reports available, activities conducted by the Navy did not kill or injure any desert tortoises (Navy 1995, 2001, 2002). In general, desert tortoises occur in low densities on the North Range of the Naval Air Weapons Station. Kiva Biological Consulting, and McClenahan and Hopkins Associates (in Service 1992a) reported that approximately 136 square miles of the North Range supported densities of 20 or fewer desert tortoises per square mile. The South Range supported densities of 20 or fewer desert tortoises per square mile over an area of approximately 189 square miles and densities of greater than 20 per square mile in approximately 30 square miles. The higher elevations and latitude in this area may be responsible for these generally low densities (Weinstein 1989 in Bureau et al. 2005).

The Indian Wells Valley, which is located to the southwest of the northern portion of the Naval Air Weapons Station, most likely supported desert tortoises at higher densities in the past. Current low densities in this area are probably due to urban, suburban, and agricultural developments. The city of Ridgecrest and town of Inyokern are located in this valley. Rose Valley, which lies generally to the north of the Indian Wells Valley and west of the northern portion of the Naval Air Weapons Station seems to support few desert tortoises and is likely the northern extent of the species' range in this portion of the Western Mojave Recovery Unit.

To the south of the Indian Wells Valley and extending west to the eastern slopes of the Sierra Nevada and Tehachapi Mountains, desert tortoises occur in generally low numbers on a mix of Bureau and private lands. They may have been more common in the past in the area west of Highway 14 between the town of Mojave and Walker Pass. High levels of off-road vehicle use and extensive livestock grazing are potential causes for the current scarcity of desert tortoises in this area. On public lands, the Bureau manages grazing by domestic sheep according to the standards and guidelines established in the California Desert Conservation Area Plan amendments for the western Mojave Desert (Bureau et al. 2005). We are unaware of any standards and guidelines associated with sheep grazing on private lands. Off-road vehicle use is also commonplace in this portion of the desert.

The western end of Antelope Valley lies south of the Tehachapi Mountains and north of the western end of the San Gabriel Mountains. This far western portion of the Mojave Desert supported juniper and Joshua tree woodlands. Desert tortoises may not have been common here, even prior to the arrival of the agricultural development that covers much of the valley. Desert tortoises persist in low numbers in creosote scrub habitat in portions of the valley. Sheep grazing, off-road vehicle use, and rural development occur in this area also. Some areas support wind energy operations. Most of the land is under private ownership.

The Department of Defense uses Edwards Air Force Base, which lies in the eastern portion of the Antelope Valley, primarily to test aircraft and weapons systems. Desert tortoises occur over approximately 220,800 acres of the installation. Approximately 80,640 acres of the base are naturally unsuitable for use by desert tortoise or are used for military operations, such as Rogers and Rosamond dry lakes. Based on surveys conducted between 1991 and 1994, approximately 160,640 acres of the base supported 20 or fewer desert tortoises per square mile. Approximately 55,040 acres supported densities between 21 and 50 desert tortoises per square mile. From 51 to 69 desert tortoises per square mile occurred on several smaller areas that totaled 5,120 acres (Air Force 2004). We expect that current densities are somewhat lower, given the regional declines in desert tortoise numbers elsewhere in the Western Mojave Recovery Unit.

Four townships of private land east of California City, north of Edwards Air Force Base, and south of the Rand Mountains supported large numbers of desert tortoises as late as the 1970s. High levels of off-road vehicle use, extensive grazing of sheep, scattered development, and possibly poaching have greatly reduced the density of desert tortoises in this area.

South of Edwards Air Force Base, the direct and indirect effects of urban and suburban development have largely eliminated desert tortoises from this area of primarily private lands that extends from Lancaster in the west to Lucerne Valley in the east. A few desert tortoises remain on the northern slopes of the San Bernardino Mountains, south of Lucerne Valley; however, they seem to be largely absent from the portion of this area in Los Angeles County (Bureau et al. 2005). The Bureau manages the 24,000-acre El Mirage Off-highway Vehicle Management Area, which lies south of the eastern portion of Edwards Air Force Base. The Bureau has designated this and three other off-highway vehicle management areas in the western Mojave Desert for use by off-road vehicles. Low numbers of desert tortoises persist in the area that generally lies between the off-highway vehicle management area and Edwards Air Force Base.

Continuing to the east, the northern portion of Joshua Tree National Park is within the Western Mojave Recovery Unit. Given the general patterns of visitor use at Joshua Tree National Park (i.e., most visitors remain close to established roads and trails), we expect that most of these areas receive little use. Private lands between the northern boundary of Joshua Tree National Park and the southern boundary of the Marine Corps Air Ground Combat Center continue to support desert tortoises. The primary threat to desert tortoises in this area is urbanization. The cities of Twentynine Palms, Yucca Valley, Joshua Tree, and Morongo Valley are located in this area.

Desert tortoises occur within the Marine Corps Air Ground Combat Center in densities of greater than 50 per square mile in limited areas. Most of the installation, however, supports from zero to five animals per square mile (Jones and Stokes Associates 1998 in Natural Resources and Environmental Affairs Division 2001). The Marine Corps' integrated natural resource management plan also notes that the number of desert tortoises may have declined in the more heavily disturbed areas of the Marine Corps Air Ground Combat Center and that vehicle strikes, common ravens, and dogs are responsible for mortalities. In general, the Marine Corps Air Ground Combat Center supports a wide variety of training exercises that include the use of tracked and wheeled vehicles, and live fire.

The 189,000-acre Johnson Valley Off-highway Vehicle Management Area lies to the west of the Marine Corps Air Ground Combat Center. The Stoddard Valley Off-highway Vehicle Management Area lies to the west of the Johnson Valley Off-highway Vehicle Management Area. Desert tortoises remain in suitable habitat primarily in areas with less recreation use.

The Mojave River valley lies to the northwest of the Marine Corps Air Ground Combat Center. It is generally a low-lying area dominated by private lands with current and fallow agricultural use. We are aware of a few records of desert tortoises in this area, primarily in creosote scrub habitat near the Marine Corps Logistics Base, Nebo, and around Elephant Mountain, which lies at the western end of the valley.

To the east of the Mojave River valley, the Cady Mountains contain numerous valleys and alluvial fans that support desert tortoises. In 2010, we issued a biological opinion to the Bureau for the construction, operation, and maintenance of a 4,613-acre solar power generating facility on the alluvial fan between the southern end of the Cady Mountains and Interstate 40 (Service 2010). We determined that the proposed action would not jeopardize the continued existence of the desert tortoise but anticipated it would result in the mortality of 30 juvenile desert tortoises and the destruction of 87 eggs. We established thresholds for re-initiation of dead or injured 6 subadult and adult desert tortoises over the life of the project or 2 in any given year. We also established a threshold that would be reached if monitoring detected a statistically significant difference in mortality between the control and resident or translocated populations. Construction of this project has not begun.

The city of Barstow lies at the western end of the Mojave River valley. A large expanse of primarily private land lies between Barstow and the city of Victorville. Now heavily used by off-road vehicles, this area likely supported high densities of desert tortoises prior to the development of surrounding areas. The cities of Adelanto, Apple Valley, and Hesperia, and the Southern California Logistics Airport generally surround Victorville.

Death Valley National Park lies to the north of Fort Irwin. Desert tortoises are uncommon in the national park, primarily because much of the habitat lies either lower or higher than optimal elevations for the species. Greenwater Valley, to the east of Death Valley, seems to support a moderate number of desert tortoises. Panamint Valley lies to the west of Death Valley, and east

of the northern section of the Naval Air Weapons Station. It supports low densities of desert tortoises, likely because of unsuitable habitat over large areas of the valley.

The Spangler Hills Off-highway Vehicle Management Area lies to the southwest of the Panamint Valley and southeast of Ridgecrest. We do not have recent information on the number of desert tortoises in this area. We expect that these areas support low densities of desert tortoises because of extensive recreational use.

Major roads include Interstates 15 and 40, and State Routes 14, 18, 58, 62, 127, 138, 178, 247, and U.S Highway 395. These roads fragment habitat. Vehicles using these roads strike and kill numerous desert tortoises every year. Portions of Interstate 15 and State Route 58 are fenced to prevent entry by desert tortoises. Smaller paved roads and unpaved roads probably do not fragment habitat to a substantial degree but are responsible for additional mortalities of desert tortoises.

The Service uses line-distance sampling to estimate the density of desert tortoises in monitored areas within the Western Mojave Recovery Unit; based on the latest information, we estimate the density to be approximately 10.1 subadult and adult desert tortoises per square mile (Service 2009b, 2010c, 2010d); we averaged the densities from sampling years 2007 through 2010). However, we do not have extensive data on the density of desert tortoises in the areas of the recovery unit that lie outside desert wildlife management areas. With the exception of two areas in 2007 (see Service 2009b), existing data were collected using methods other than line-distance sampling and are not comparable to the numbers obtained through line-distance sampling. Examples include a Bureau study of desert tortoise density west of State Route 14 between Red Rock Canyon State Park and State Route 178 (Keith et al. 2005) and various surveys of the eastern Antelope Valley, Victor Valley, and near the town of Rosamond. Consequently, we do not have comparable information regarding densities for most areas outside of critical habitat and desert wildlife management areas.

The following paragraphs describe the status of the desert tortoise within desert wildlife management areas in the Western Mojave Recovery Unit. The Ord-Rodman Desert Wildlife Management Area is located southeast of Barstow. It lies south of Interstate 40, east of State Route 247, west of Argus Mountain, and north of the central portion of the Fry Mountains. The recovery plan states that densities of desert tortoises in this recovery unit vary from 5 to 150 animals per square mile (Service 1994). In 2010, the Service (2010d) estimated a density for the Ord-Rodman Desert Wildlife Management Area of approximately 19.5 subadult and adult desert tortoises per square mile based on line-distance sampling transects.

The Superior-Cronese Desert Wildlife Management Area is bordered on the west by the Fremont-Kramer Desert Wildlife Management Area and Cuddleback Dry Lake; on the north by the northern end of Superior Valley and NASA Road on the National Training Center; on the east by West Cronese Dry Lake; on the southeast by Interstate 15; and on the south and southwest by Rainbow Basin National Natural Landmark and the southern end of the Gravel Hills. The recovery plan states that densities of desert tortoises in this recovery unit vary from

20 to 250 animals per square mile (Service 1994). In 2010, the Service (2010d) estimated a density for the Superior-Cronese Desert Wildlife Management Area of approximately 6.8 subadult and adult desert tortoises per square mile based on line-distance sampling transects.

The Fremont-Kramer Desert Wildlife Management Area is located west of the Superior-Cronese Desert Wildlife Management Area on both sides of U.S. Highway 395. Density estimates for the Fremont-Kramer Desert Wildlife Management Area, as determined on permanent study plots and strip-transects between 1990 and 1991, varied from 5 to 100 animals per square mile with average densities of approximately 15 individuals per square mile (Service 1994). In 2010, the Service (2010d) estimated a density for the Fremont-Kramer Desert Wildlife Management Area of approximately 6.5 subadult and adult desert tortoises per square mile based on line-distance sampling transects.

The Pinto Mountain Desert Wildlife Management Area is located north of the northeastern corner of Joshua Tree National Park. The recovery plan does not specifically address the density of desert tortoises in this area (Service 1994). In 2010, the Service (2010d) estimated a density for this desert wildlife management area to be approximately 8.8 subadults and adults per square mile based on line-distance sampling transects.

In previous consultations (e.g., regarding the California Desert Conservation Area [Service 2007]), we estimated the numbers of desert tortoises in various recovery units based primarily on the densities provided by line-distance sampling and the acreages of desert wildlife management areas, units of critical habitat, and other potential habitat without adjustment for the potential suitability of habitat. We did not attempt to eliminate areas of non-habitat because of the difficulty in determining such areas on the scale of the recovery units. Since that time, Nussear et al. (2009; see the next section of this biological opinion [Habitat of the Desert Tortoise within the Western Mojave Recovery Unit] for a description of their methodology) developed a model of desert tortoise habitat that allows us to estimate the area of desert tortoise habitat. We used this model to estimate the amount of potential desert tortoise habitat in an area, then removed areas of such habitat that have been subjected to human disturbance by using data from The Nature Conservancy (2010).

Data on the density of desert tortoises are largely lacking from outside of critical habitat and desert wildlife management areas. To estimate the number of desert tortoises in these areas, we have provided a potential range of densities by multiplying the acreage of these areas by the average density as determined by line-distance sampling within desert wildlife management areas and critical habitat as an upper limit; for the lower limit, we multiplied this acreage by one-tenth of the average density.

Using this method, we can likely provide a more accurate estimate of the number of desert tortoises over large areas of the desert. The accuracy of the estimates derived from this method remain subject to numerous variables that likely affect its overall accuracy (e.g., the digitizing of the recovery unit boundaries, the scale at which the Nussear et al. model was developed, the accuracy of the information from The Nature Conservancy, etc.). Despite the unknowns

involved in deriving this estimate, it provides us with some quantification of the number of subadult and adult desert tortoises in a recovery unit. The estimates of subadult and adult desert tortoises in the Western Mojave Recovery Unit used in this biological opinion follow:

Western Mojave Recovery Unit ¹	Area (square miles)	Density of Desert Tortoises per Square Mile	Number of Desert Tortoises
Total Area of Modeled Desert Tortoise Habitat ²	13,385		
Disturbed Modeled Desert Tortoise Habitat ³	910		
Net Modeled Desert Tortoise Habitat ⁴	12,475		
Net Modeled Desert Tortoise Habitat within Desert Wildlife Management Areas and Critical Habitat	4,997	10.1 ⁵	50,470
Net Remaining Modeled Desert Tortoise Habitat outside Desert Wildlife Management Areas and Critical Habitat	7,478	10.1 ⁶	75,528
		1.0 ⁷	7,478
Total Number of Desert Tortoises			57,948 – 125,998

Key

¹ Unless otherwise noted, all acreages are from Waln 2011.

² Modeled desert tortoise habitat is from Nussear et al. (2009).

³ From USC or TNC

⁴ The area of Modeled Desert Tortoise Habitat minus the area of disturbed modeled desert tortoise habitat.

⁵ From Service (2009b, 2010c, 2010d); we averaged the densities from sampling years 2007 through 2010.

⁶ We do not have substantial information on the number of desert tortoises outside of desert wildlife management areas and critical habitat. Consequently, in this section, we use the same density we derived for the desert wildlife management areas and critical habitat.

⁷ See footnote 6. In this section, we used a density of one-tenth of that in desert wildlife management areas and critical habitat.

Based on the estimate of the number of subadult and adult desert tortoises in the Western Mojave Recovery Unit, we estimated the number of juvenile desert tortoises and eggs that the area also supports as described in the Environmental Baseline - Status of the Desert Tortoise in the Action Area section of this biological opinion. (Eggs would be present only for a portion of any given year.) The following tables depict these estimates:

	Number of Subadult and Adult Desert Tortoises ¹	Number of Juvenile Desert Tortoises ²
Within Desert Wildlife Management Areas and Critical Habitat	50,470	52,530
Outside Desert Wildlife Management Areas and Critical Habitat	75,528 ³	78,611
	7,478 ⁴	7,783
Total Number of Juvenile Desert Tortoises		60,313 – 131,141 ⁵

Key:

¹ From preceding table.

² Derived by assuming that juveniles comprise 51 percent of the overall population. (See the Environmental Baseline – Status of the desert tortoise in the Action Area section of this biological opinion for all references.)

³ Upper limit estimate of the number of subadult and adult desert tortoises outside of desert wildlife management areas and critical habitat.

⁴ Lower limit estimate of the number of subadult and adult desert tortoises outside of desert wildlife management areas and critical habitat.

⁵ These estimates are the ‘within’ number added to the ‘low range’ or ‘high range’ numbers.

	Number of Subadult and Adult Female Desert Tortoises ¹	Number of Juvenile Desert Tortoise Eggs ²
Within Desert Wildlife Management Areas and Critical Habitat	25,235	234,181
Outside Desert Wildlife Management Areas and Critical Habitat	37,764 ³	350,450
	3,739 ⁴	34,698
Total Number of Juvenile Desert Tortoises		268,879 - 584,631 ⁵

Key:

¹ We assumed a ratio of males to females of 1:1. These estimates were derived by dividing the number of subadult and adult desert tortoises from the previous tables by 2.

² Derived by assuming that each female produces 1.6 clutches with 5.8 eggs per clutch.

³ High range estimate of the number of subadult and adult female desert tortoises outside of desert wildlife management areas and critical habitat.

⁴ Low range estimate of the number of subadult and adult female desert tortoises outside of desert wildlife management areas and critical habitat.

⁵ These estimates are the ‘within’ number added to the ‘upper limit’ or ‘lower limit’ numbers.

Habitat of the Desert Tortoise within the Western Mojave Recovery Unit

Nussear et al. (2009) modeled desert tortoise habitat across the range of the desert tortoise. This model, based on 3,753 desert tortoise locations, uses 16 environmental variables, such as precipitation, geology, vegetation, and slope. In addition, Nussear et al. (2009) used 938 additional occurrence locations to test the model’s accuracy. Although this analysis likely omits some marginal desert tortoise habitat, it explains the occurrence of 95 percent of the 938 test points used in the Nussear et al. (2009) model. The modeling and mapping analysis do not consider habitat loss, fragmentation, or degradation associated with human-caused impacts.

Because the modeling and mapping analysis do not consider habitat loss, fragmentation, or degradation associated with human-caused impacts, we estimated how much modeled desert tortoise habitat has likely been degraded or lost by subtracting the acreage of urbanized and agricultural areas as shown by The Nature Conservancy (2010) from the total. Based on this calculation, approximately 12,475 square miles of potential desert tortoise habitat remain within the Western Mojave Recovery Unit (Waln 2011). (We subtracted only The Nature Conservancy’s “highly disturbed” category from the total amount of potential desert tortoise habitat. The Nature Conservancy’s ‘moderately disturbed’ category contains some areas that, based on our knowledge, are highly disturbed and support few, if any desert tortoises (e.g., maneuver areas at Fort Irwin) and other areas that are somewhat less disturbed and continue to support some desert tortoises (e.g., some private lands). At this time, we do not have the ability to separate out and quantify these areas.)

The acreages depicted here of desert tortoise habitat and the amount of development are not precise, given the difficulty of mapping at this scale. They do, however, provide a reference point relative to the amount of desert tortoise habitat within the Western Mojave Recovery Unit. This information also demonstrates that, although large amounts of desert tortoise habitat remain in the Western Mojave Recovery Unit, human activities have removed a substantial amount of modeled habitat and fragmented the remaining habitat to some degree. As our ability to quantify disturbance and estimate the density of desert tortoises improves, we expect to refine these estimates further.

Fires

Since December 2004, numerous wildfires have occurred in desert tortoise habitat across its range. Although we know that some desert tortoises were killed by wildfires, mortality estimates are not available. We estimate that approximately 300,000 acres of potential desert tortoise habitat burned in the Northeastern Mojave Recovery unit in 2005 (Burroughs 2005). This

acreage includes approximately 109,000 acres of critical habitat (Clayton 2005). In total, approximately 136,447 acres of critical habitat burned in the 2005 fires (Clayton 2005).

Recovery Unit	Critical Habitat Unit	Acres Burned
Upper Virgin River	Upper Virgin River	10,446
Northeastern Mojave	Beaver Dam Slope	46,757
Northeastern Mojave	Gold Butte-Pakoon	62,466
Northeastern Mojave	Mormon Mesa	15,559
Eastern Mojave	Piute-Eldorado	154
Eastern Mojave	Ivanpah	1,065
Total		136,447

The 136,447 acres of critical habitat that burned represent approximately 2.1 percent of the total amount of critical habitat that designated for the desert tortoise. Given the patchy distribution of the primary constituent elements of critical habitat across the critical habitat units and the varying intensity of the wildfires, we cannot quantify precisely the extent to which these fires disrupted the function and value of the critical habitat.

ENVIRONMENTAL BASELINE

Action Area

The implementing regulations for section 7(a)(2) of the Act define the “action area” as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For the purposes of this biological opinion, we consider the action area to include all areas of the 1,765-acre project site and the 137.25 kilometers of fiber optic line and their necessary components as described in the Description of the Proposed Action section of this biological opinion, a 797-meter buffer from the Mojave Solar facility project boundary, the proposed desert tortoise translocation areas, all contiguous desert tortoise habitat within 1.5 kilometers of the translocation areas receiving desert tortoises from less than 500 meters, all contiguous desert tortoise habitat within 6.5 kilometers of translocation areas receiving desert tortoises from greater than 500 meters away, and all desert tortoise habitat within a 1,000-meter buffer centered around the fiber optic line (500 meters on each side).

We included the 797-meter buffer from the project boundary to address adverse effects to desert tortoises whose home ranges overlap the proposed solar facility; the buffer is based on the assumption that the home range of a male desert tortoise is approximately 2 square kilometers (O’Conner et al. 1994, Duda et al. 1999, Harless et al. 2009). We included habitat within 1.5 and 6.5 kilometers of the translocation areas to address the area in which desert tortoises may disperse following translocation. For situations where desert tortoises are translocated less than 500 meters, the buffer is based on the maximum straight-line distance that a male desert tortoise traveled in the first year following translocation (Walde et al. 2008). For situations where desert tortoises are translocated more than 500 meters, the buffer is based on the upper limits of the 95 percent confidence interval for the maximum straight-line distance that male and female desert

tortoises were observed to disperse during the first year after release (Nussear 2004, Field et al. 2007, Drake et al. 2009). We included the buffer around the fiber optic line to address the area where a desert tortoise could be placed if it must be moved from harm's way during the installation of the lines.

The action area defined for this biological opinion covers approximately 57,381 acres of desert tortoise habitat. The translocation areas for the proposed Mojave Solar facility are the lands adjacent to the project site that contain suitable desert tortoise habitat. These areas include the land on the west edge of the Alpha site and the eastern and southern edge of the Beta site (Karl 2011).

Past Consultations in the Action Area

The Service (1989a) issued a biological opinion to the Bureau for the construction of the existing solar facility at Harper Dry Lake and the power lines that connect the facility to the electrical grid. We concluded that the proposed action was not likely to jeopardize the continued existence of the desert tortoise; although the electrical lines from the existing facility cross critical habitat, the Service had not designated critical habitat at the time of this consultation. This consultation resulted in the installation of fencing to exclude desert tortoises along most of the length of Harper lake Road. We anticipated that 10 desert tortoises were likely to be taken as a result of the proposed action; we have not received any reports of desert tortoises being injured or killed as a result of construction and operation of the solar power plant.

The Service (1989b) issued a biological opinion to the Federal Highway Administration for the widening of a portion of State Route 58. We concluded that the proposed action was not likely to jeopardize the continued existence of the desert tortoise; the Service had not designated critical habitat at the time of this consultation. This consultation resulted in the installation of fencing to exclude desert tortoises along approximately 15 miles of State route 58. We anticipated that 5 desert tortoises were likely to be taken as a result of the proposed action; to the best of our knowledge, no desert tortoises were killed or injured during the widening project.

The Service (1990) issued a biological opinion for the Kern River and Mojave Pipeline projects. The biological opinion anticipated that pipeline installation would kill or injure 15 desert tortoises along the Mojave River portion of the line in addition to harassing 120 desert tortoises and eliminating 16 nests. For the operation and maintenance of the pipeline, the biological opinion anticipated the harm or mortality of five desert tortoises and the harassment of ten desert tortoises. The Mojave Pipeline crosses the Kramer to Victor fiber optic line. In total, 38 desert tortoises were killed during the construction of these 2 pipelines (Circle Mountain Biological Consultants 1996). We cannot determine whether any desert tortoises were killed within the portion of the action area included in this biological opinion; however, given the small overlap of the action areas of the two consultations, we expect that few, if any, desert tortoises were encountered in this area during construction of the pipeline.

We issued a biological opinion to the Bureau for the construction, operation, and maintenance of a 230-kV translocation from Kramer Junction to Victorville (Service 1991). The proposed action would result in the permanent loss of approximately 4 acres of habitat; although the transmission line passes through critical habitat of the desert tortoise, this project was completed prior to the designation of critical habitat in 1994. We anticipated that one desert tortoise was likely to be killed during construction and that five desert tortoises were likely to be killed as a result of maintenance over the 30-year life of the transmission line; we have no record of whether take actually occurred.

The Service (1995c) issued a biological opinion to the Bureau for the maintenance and repair of Southern California Gas Company's pipeline system in the California deserts. This biological opinion anticipated the mortality of two desert tortoises per year as a result of maintenance activities including travel on all associated access roads. A portion of the pipeline system passes through the action area considered in this biological opinion near the Tortilla Substation. The Southern California Gas Company has killed few desert tortoises during its maintenance activities; to the best of our knowledge, none were killed in this area of overlap.

The Service (2000) issued a biological opinion to the Bureau for the installation, operation, and maintenance of a natural gas line between Kramer Junction and Victorville by Southwest Gas Corporation. The pipeline was to be installed in the same utility right-of-way in which the fiber optic line for this consultation would be installed. We concluded that the proposed right-of-way grant was not likely to jeopardize the continued existence of the desert tortoise or adversely modify its critical habitat. This pipeline was not constructed. In 2001, the Service (2001) issued a biological opinion to the Bureau for the installation, operation, and maintenance of a natural gas line between Kramer Junction and Adelanto by the Southern California Gas Company. Except for the last 4 miles, this pipeline followed the route analyzed in the 2000 consultation. The proposed action resulted in the disturbance of approximately 355 acres of desert tortoise habitat, approximately 260 of which were located within the Fremont-Kramer Critical Habitat Unit; most of this disturbance was temporary. We anticipated that few desert tortoises were likely to be killed or injured.

The Service (2003) issued a biological opinion to the Bureau regarding the effects of the designation of routes of travel in the western Mojave Desert on the desert tortoise and its critical habitat. As a result of the proposed action, the Bureau designated routes of travel on public lands as open, closed, or limited to vehicular use. The proposed action resulted in a reduction in the mileage of open routes on public lands; additionally, any route that was not designated as open was considered to be an unauthorized route. The Service concluded that the Bureau's designation of routes of travel was not likely to jeopardize the continued existence of the desert tortoise or adversely modify its critical habitat. Although the Service did not estimate the number of desert tortoises that could be killed or injured by the project because of the large size of the action area and the patchy distribution of desert tortoises, it required the Bureau to contact the Service to determine if re-initiation was necessary if more than 5 desert tortoises were found dead or injured in a 12-month period. To date, although some desert tortoises have been killed, the re-initiation threshold has not been met; we cannot determine whether any of these

mortalities occurred within the action area for this consultation. Open routes cross the action area for this project (i.e., the fiber optic lines) in many locations.

We issued a biological opinion to the Bureau regarding the effects of a proposed amendment to the California Desert Conservation Area Plan for the western Mojave Desert on the desert tortoise and its critical habitat (Service 2006b). In this case, the Bureau's proposed action was a substantial revision of the California Desert Conservation Area Plan, with the fundamental goal of adopting numerous management prescriptions that were intended to promote the recovery of the desert tortoise. These prescriptions addressed grazing, land use classification, recreation, and numerous other elements of the Bureau's management of the western Mojave Desert, including a minor revision of the route network considered in the consultation discussed in the previous paragraph. The Service concluded that the Bureau's amendment of the California Desert Conservation Area Plan for the western Mojave Desert was not likely to jeopardize the continued existence of the desert tortoise or adversely modify its critical habitat because the vast majority of changes addressed in the amendment reduced the intensity of use and were protective of the desert tortoise. We established thresholds for the re-initiation of formal consultation in an amendment to this biological opinion (Service 2007). To date, although some desert tortoises have been killed, none of the re-initiation thresholds have been met; we cannot determine whether any of these mortalities occurred within the action area for this consultation. The entire action area for this project is within the action area for the California Desert Conservation Area Plan consultation.

We have issued several biological opinions to the Federal Highway Administration and California Department of Transportation regarding the widening of Highways 58 and 395; the fiber optic lines for the proposed action line, at least in part, along these roadways. None resulted in determinations of jeopardy or adverse modification of critical habitat. We issued a biological opinion to the Federal Highway Administration for the widening of 15 miles of State Route 58 from Kramer Junction (U.S. Route 395) to the east (Service 1989). The proposed action resulted in the loss of approximately 283 acres of habitat of the desert tortoise; although State Route 58 passes through critical habitat of the desert tortoise, this project was completed prior to the designation of critical habitat in 1994. We anticipated that five desert tortoises were likely to be killed as a result of construction; we have no record of whether take actually occurred.

We issued a biological opinion to the California Department of Transportation for the widening of approximately 16 miles of U.S. Route 395 between State Routes 18 and 58 (Service 2008d). The proposed action would result in the loss of 198 acres of habitat of the desert tortoise. We established a re-initiation threshold of three injured or dead desert tortoises. At this time, the California Department of Transportation has not initiated construction of this project (Wentworth 2011).

We issued a biological opinion to the California Department of Transportation for the widening of 16 miles of U.S. Route 395 just north of Interstate 15 (Service 2009c). The proposed action would result in the loss of 136 acres of critical habitat within the Fremont-Kramer Critical

Habitat Unit and 100 acres of habitat that lie outside this unit. We established a re-initiation threshold of four injured or dead desert tortoises. At this time, the California Department of Transportation has not initiated construction of this project (Wentworth 2011).

In aggregate, the number of desert tortoises that we anticipated would likely be killed or injured by the actions proposed in the aforementioned biological opinions comprises a relatively small portion of the desert tortoises in the action area. Furthermore, several of the biological opinions described in this section analyzed the effects of actions that extended over action areas many times the size of the action area being considered in this consultation. Therefore, the mortality associated with these larger actions would not occur or has not occurred entirely within the action area for the Abengoa project (including the upgrades to the SCE transmission lines). Consequently, we conclude that the mortality associated with these biological opinions has not substantially affected the environmental baseline of the desert tortoise within the current action area.

Habitat Characteristics of the Action Area

The proposed Mojave Solar facility site and portions of the translocation sites adjacent to the project boundary are owned by Abengoa. Additional lands within the 797-meter buffer around the solar facility are privately owned by multiple landowners and the Bureau. The fiber optic lines cross through a combination of privately owned and public lands. We summarized the information in the remainder of the Environmental Baseline section from the biological assessment (AECOM 2010) and translocation plan (Karl 2011).

The Mojave Solar facility site consists primarily of abandoned agricultural fields; one active center pivot field currently produces alfalfa on site. In addition, desert scrub habitat has recovered on approximately 430 acres of the abandoned farmland; less than 2 acres of saltbush scrub has also recovered. The buffer and translocation areas adjacent to the project site are composed of desert wash scrub, creosote bush scrub and saltbush scrub.

The SCE fiber optic lines extend across multiple plant communities; we summarize each of the three transmission corridors briefly, additional details can be found in the biological assessment (AECOM 2010). The Lockhart to Tortilla substation fiber optic line corridor contains the desert saltbush scrub, Mojave desert creosote bush scrub *Ambrosia dumosa*-dominant, fallow agriculture-ruderal, active agriculture, Mojave desert wash sandy areas, tamarisk scrub, and the Mojave River. Dominant vegetation communities and cover types along the Lockhart to Kramer substation fiber optic line corridor include desert saltbush scrub, Mojave desert creosote bush scrub *Ambrosia dumosa* dominant, Mojave desert creosote bush-*Ambrosia dumosa*-*Atriplex* scrub, fallow agriculture-ruderal, active agriculture, and developed areas. The Kramer to Victor substation fiber optic line corridor includes the desert saltbush scrub, Mojave desert creosote bush scrub, Mojave desert creosote bush scrub *Ambrosia dumosa*-dominant, developed areas, disturbed habitat, and Joshua tree woodland.

Most of the fiber optic lines will be installed on existing transmission lines. Although the Bureau did not provide information on the habitat characteristics along the transmission lines, access roads typically run parallel to the transmission lines and a short spur road generally leads from the access road to each pole. Each pole is surrounded by a small area of disturbance created by installation and maintenance.

Status of the Desert Tortoise in the Action Area

In April and May 2008, Abengoa conducted protocol desert tortoise surveys Service (1992b) on the 1,765-acre Mojave Solar facility site and on 3,146 acres of habitat surrounding the proposed facility. Additional reconnaissance and focused surveys were conducted on portions of the solar facility in 2006, 2007, and 2009. Over the 4 years of survey effort, Abengoa did not detect any desert tortoises within the proposed solar facility site, but detected 3 live desert tortoises within 1,000 feet of its boundary. Desert tortoise sign observed within the Mojave Solar facility boundary consisted of carcass parts, scat, and a single burrow. Surveys that extended outside of the solar facility site boundaries detected more abundant desert tortoise sign to the east, west, and south (Karl 2011).

Based on these results, we expect the Mojave Solar project site to support few, if any, resident desert tortoises. The primary reason for the paucity of desert tortoises is the disturbed nature of the site. Some potential exists that desert tortoises may occasionally cross the site or that they may enter the site to forage (when annual plants are abundant); these latter individuals may not construct burrows on the site if the previous human disturbance has disrupted the compaction of substrates to the extent that burrowing is no longer possible. Because we cannot completely dismiss the potential for desert tortoises to be present within the boundaries of the proposed solar facility, we will estimate that four individuals (of any size, i.e., juvenile, subadult and adult) may be present within this area.

The action area immediately surrounding the solar facility site contains approximately 34,365 acres of desert tortoise habitat. We estimate that this area may contain 542 subadult and adult desert tortoises, based on the average density (3.9 desert tortoises per square kilometer) of desert tortoises in the West Mojave Recovery Unit (Service 2009b, 2010c, 2010d).

Juvenile desert tortoises are extremely difficult to detect because of their small size and cryptic nature. Based on a 4-year study, Turner et al. (1987) determined that juveniles accounted for 31.1 to 51.1 percent of the overall population. Reproductive success and neonate survival are likely to vary significantly across the range of the desert tortoise. Consequently, the result of the Turner study may not adequately represent demography around the Mojave Solar project site. However, using estimated numbers for subadult and adult desert tortoises, we estimate the action area immediately surrounding the solar facility site contains 243 to 564 juveniles.

Neither SCE nor the Bureau conducted surveys of the proposed fiber optic lines. Given that the majority of the fiber optic lines parallel busy roadways where desert tortoise densities are likely depressed (Hoff and Marlow 2002) and that the areas of disturbance would be so small (23.11

acres, distributed among many smaller sites), we will not estimate the number of desert tortoises that may occur in these disturbed areas. Furthermore, we will not estimate the number of desert tortoises in the action area adjacent to the transmission lines. Because of the linear nature of this portion of the project, we anticipate that desert tortoises moved from harm's way will remain within their current home ranges and not affect adjacent animals.

By multiplying the average number of clutches produced per reproductive female in a given year (i.e., 1.6, see Turner et al. 1984) by the average number of eggs found in a clutch (5.8 eggs; Turner et al. 1986 in Service 1994), we estimate that each reproductive female could produce 9.28 eggs in a given year. Using this information and assuming a 1:1 sex ratio, we estimate that the action area immediately surrounding the solar facility site may contain as many as 271 reproductive females and 2,515 eggs in a given year. Because of the low number of desert tortoises expected to be in the solar facility site, we will not calculate the number of desert tortoise eggs that could be present. Regardless, few, if any, eggs are likely to be present because we anticipate that desert tortoises would not establish nests in the former agricultural area where the solar plant would be built. Furthermore, we will not estimate the number of desert tortoise eggs along the fiber optic lines, because the area of disturbance is so small and linear that desert tortoises are unlikely to establish nests within these areas. Because we cannot completely dismiss the potential for desert tortoise nests to be present within the boundaries of the proposed solar facility site, we will estimate that five nests (i.e., 29 eggs) may be present within this area.

We emphasize that, although our estimate of the number of subadult and adult desert tortoises, juveniles, and eggs on the project site and within action area is based on the best scientific and commercial data, as required by the implementing regulations for section 7(a)(2) (50 Code of Federal Regulations 402.14(g)(8)), these numbers represent only an estimate; the overall number of animals and eggs on site may be different. We recognize that the survey data used for these estimates represents a single point in time and the number of individuals in these areas may change by the onset of construction. For example, some desert tortoises may leave or die. Alternatively, the number of desert tortoises present on the site may increase by the time construction commences. For example, one or more desert tortoises may not have been detected during the initial survey; other desert tortoises may have moved on to the site since the time of the surveys. Finally, desert tortoises may have emerged from a nest on the site; this scenario could increase the overall number of individuals; for example, if a clutch of seven eggs (i.e., the number of eggs in a clutch that would be considered large) hatched, this increase would be much more than we would expect from individuals moving on to the site.

EFFECTS OF THE ACTION

In the previous section of this biological opinion, we derived our estimates of the numbers of juvenile, subadult, and adult desert tortoises that are likely present in the action area from the pre-project survey data and published literature. These sources constitute the best available information. Consequently, we have used the estimates of the numbers of juvenile, subadult, and adult desert tortoises from the Environmental Baseline in the following analysis. Because of the desert tortoise's cryptic coloration, fossorial habits, and relatively small size, we recognize that

not all individuals that are injured or killed during construction, operations, and maintenance will be detected by monitors and workers and reported to us. Juvenile desert tortoises and eggs will be even more difficult to detect, because they are even smaller and, in the case of eggs, always hidden from sight. Lastly, scavengers may find the carcass before monitors or workers and remove it or dismember it to the extent that the cause of death may not be determinable.

During the construction, operation, and maintenance of the proposed project, desert tortoises that are overlooked could be injured. The minimization measure proposed by Abengoa and SCE, to give consideration to taking the injured individual to a veterinarian if the Service and CDFG cannot be reached, does not provide adequate protection because the desert tortoise may die if treatment is delayed.

Translocation of Desert Tortoises from the Mojave Solar Facility

The primary effects of the proposed solar facility on desert tortoises would result from their capture and translocation prior to ground disturbance associated with construction. We anticipate that Abengoa would capture and translocate all subadult and adult desert tortoises from the Mojave Solar facility site. Because of the difficulty in locating juvenile desert tortoises, Abengoa may not find all the juveniles on the solar facility site and thus may move some but not all juvenile desert tortoises from the solar facility site. Abengoa would move all desert tortoises to the translocation area nearest their points of capture.

Based on the current surveys of the Mojave Solar facility site, which indicate that desert tortoises do not occur on the site, we estimate that Abengoa would translocate few, if any, desert tortoises. Because desert tortoises have been found immediately adjacent to the site of the proposed solar facility, some may have entered the site since the last time the area was surveyed. For the purposes of this consultation, we are assuming that four desert tortoises (of all sizes) and five nests may occur within the boundary of the proposed solar facility.

Based on the previous assumption, we anticipate that Abengoa will capture, handle, and attach transmitters to no more than four desert tortoises. We have addressed the effects of capturing, handling, and attaching transmitters to these animals later in our analysis.

Abengoa will conduct health assessments on all resident desert tortoises that are within 1.5 kilometers of a desert tortoise translocated less than 500 meters and all desert tortoises within 6.5 kilometers of desert tortoises translocated greater than 500 meters. This assessment will include the collection of a blood sample and the attachment of a transmitter on all desert tortoises within the 6.5-kilometer area around desert tortoises translocated greater than 500 meters. Depending on the number of desert tortoises moved from the proposed solar site and the location to which they would be translocated, up to 542 desert tortoises may be assessed regarding their state of health. If no animals are moved greater than 500 meters, we estimate that approximately 65 desert tortoises will be handled for visual health assessments (i.e., no blood collection or attachment of transmitters) within the 1.5-kilometer buffer. Some potential exists that handling

and drawing blood from desert tortoises for disease tests may cause elevated levels of stress that may render these animals more susceptible to disease or dehydration from loss of fluids.

Translocation has the potential to increase the prevalence of diseases, such as upper respiratory tract disease, in a resident population. Some potential exists that handling and drawing blood from desert tortoises for disease tests may cause elevated levels of stress that may render these animals more susceptible to disease or dehydration from loss of fluids. In addition, stress associated with handling and movement or due to density dependent effects could exacerbate the threat of increased disease prevalence if translocated individuals with subclinical upper respiratory tract disease or other diseases begin to exhibit clinical signs of disease. This conversion of translocated desert tortoises from a non-contagious to a contagious state may increase the potential for infection in the resident population above pre-translocation levels.

We cannot reasonably predict the increase in disease prevalence within the resident population that may occur due to translocation. However, several mitigating circumstances are likely to reduce the magnitude of this threat. First, Abengoa will use experienced biologists and approved handling techniques that are unlikely to result in substantially elevated stress levels that can make translocated animals more susceptible to disease or make them convert from a non-contagious to contagious state. Second, Abengoa will conduct thorough health assessments using qualified biologists to identify any visual signs of disease for desert tortoises being moved less than 500 meters to reduce the potential of introducing disease into the resident population. Third, Abengoa will collect blood and perform additional disease tests (i.e., ELISA testing) for all desert tortoises that it moves greater than 500 meters per the recommendation of the Desert Tortoise Recovery Office (Service 2010e) to reduce the potential of introducing disease into the resident population. Fourth, the desert tortoises on the project site are currently part of a continuous population with the resident populations in the translocation area where all the desert tortoises will be moved and are likely to share similar pathogens and immunities. Fifth, Abengoa will not translocate any animal that either has clinical signs of disease or tests ELISA-positive to reduce the potential of introducing disease into the resident population. Sixth, Abengoa will buffer any resident individual showing signs of disease in the translocation area by 1.5 kilometers, when receiving individuals from less than 500 meters away, or 6.5 kilometers, when receiving individuals from greater than 500 meters away. Last, density-dependent stress is unlikely to occur for the reasons discussed later in our analysis.

Although the measures proposed by Abengoa and the other mitigating circumstances described above are substantial barriers to disease spread, the potential for post-translocation disease transmission remains. Without consideration of post-translocation dispersal in analysis of resident disease prevalence at translocation sites, some potential exists that dispersing desert tortoises may move into areas where they may contract diseases from resident animals. However, because we anticipate that the desert tortoises moved from the Mojave Solar facility site maintain a portion of their territories within the translocation area, we anticipate that dispersal distances will be minimal and therefore the potential for disease transmission associated with greater dispersal distances is low. Additionally, because no topographic or anthropogenic barriers exist between any desert tortoises in the translocation area and the project

site, these individuals have the potential to interact over time absent the translocation (although we acknowledge that moving animals may cause them to move greater distances over a shorter period of time).

Because ELISA testing can result in false positive results (i.e., an animal may test positive even though it is not a carrier of the disease), the potential exists for removal of healthy individuals from the translocated population due to concern over disease. These individuals would not be released into the wild and would no longer contribute to the population. In addition, removal of these animals may reduce the resistance of the population to disease outbreaks because they may carry immunities that could buffer the population against an outbreak that results in high mortality of animals that are not immune. Because Abengoa would coordinate with the Service and perform follow-up testing of ELISA-positive individuals, the potential for removing false-positive individuals from the translocated population is low. We expect that, of the small number of desert tortoises that may be moved from the solar facility site, only a small subset are likely to test positive for upper respiratory tract disease. Of these positive desert tortoises, an even smaller subset would test positive on a second ELISA screening. Consequently, we conclude that few desert tortoises will be incorrectly removed from the population due to false positive results.

Translocating desert tortoises may also adversely affect resident desert tortoises within the translocation area due to local increases in population density. However, because the Mojave Solar facility contains very limited habitat and no individuals were detected on the site during surveys, we expect that few desert tortoises will be found on the solar facility site. Consequently, the movement of no more than four animals into the larger surrounding area is highly unlikely to cause adverse effects related to the density of individuals. We reached this conclusion in part because Saethre et al. (2003) did not detect any trends in body condition index, reproduction, or presence of the symptoms of upper respiratory tract disease in desert tortoises in enclosures at densities far greater than those possible in this situation. Additionally, any desert tortoises that are found near the periphery of the proposed solar site likely maintain territories that include the adjacent lands and thus are already living at or near the density that would be created by the movement of a few individuals into the area.

If desert tortoises need to be translocated greater than 500 meters, Abengoa will use quarantine pens to hold them while waiting for disease test results. Abengoa will construct all quarantine pens following the specifications of the translocation plan (Karl 2011). The quarantine pens will be 50 by 50 meters and an animal husbandry plan approved by experienced personnel from an accredited American Zoological Association institution will guide care of the desert tortoises during quarantine. Maintaining the desert tortoises within quarantine pens could increase their vulnerability to exposure, stress, dehydration, inadequate food resources, and predation. Because Abengoa will regularly monitor the desert tortoises and provide care based on an approved plan and the desert tortoises will be held for a limited amount of time, we anticipate that the quarantined individuals are unlikely to experience from exposure, stress, dehydration, or inadequate nutrition. However, the potential exist that predators or poachers could target desert tortoises in the quarantine pens.

Abengoa will place juvenile desert tortoises moved greater than 100 meters into temporary holding pens so that they can acclimate to their new surroundings. Abengoa will construct the pens as described in the desert tortoise translocation plan (Karl 2011). The size of the pen will depend on how many juveniles need to be held, but will be a minimum of 6 by 15 meters. The enclosures will be covered with netting to prevent avian predators from reaching the juveniles. Maintaining the juvenile desert tortoises within pens could increase their vulnerability to exposure, stress, dehydration, inadequate food resources, and predation. Because the pens will be constructed to prevent predation and will be monitored regularly and the juveniles will be held for a limited time (approximately 2 weeks), we anticipate that the juveniles' health and safety while in the pens are unlikely to be compromised. In some instances, however, predators, such as common ravens, have been observed frequenting desert tortoise enclosures and preying on juveniles when they were released directly from the pens.

Following release, we cannot predict the movement patterns that all translocated animals are likely to exhibit. Desert tortoises translocated shorter distances (i.e., less than 500 meters) are not likely to move as far following release as those moved longer distances. Walde et al. (2008) found that maximum straight-line dispersal distance for male desert tortoises was approximately 1.5 kilometers in the first year following translocation. For desert tortoises translocated greater than 500 meters, mean straight-line dispersal distances of adult translocated desert tortoises (males and females) reported by Nussear (2004, Figures 2 and 4) were approximately 1, 1.5, 1.8, 3.5, and 6 kilometers. Walde et al. (2008) reported mean straight-line dispersal distances of adult translocated desert tortoises using 2 experimental treatments as 2.6 and 4.2 kilometers for males and 1.5 and 2.3 kilometers for females. Maximum straight-line dispersal distances for translocated male desert tortoises ranged from 6.2 to 23 kilometers in the first year following translocation (Field et al. 2007, Walde et al. 2008). Maximum straight-line dispersal distances for translocated males at each site reported in these studies varied from 6.2 kilometers (Field et al. 2007) to 7.3, 7.4, 11.3, 11.6, and 12.6 kilometers (Walde et al. 2008).

Translocated populations can also expand the area they occupy in the first year following translocation (e.g., from 3.9 to 6.9 square miles at a Nevada site; from 0.2 to 10.3 square miles at a Utah site). The degree to which these animals expand the area they use depends on whether the translocated animals are released into typical or atypical habitat; that is, if the translocation area supports habitat that is similar to that of the source area, desert tortoises are likely to move less (Nussear 2004). Translocated animals appear to reduce movement distances following their first post-translocation hibernation to a level that is not significantly different from resident populations (Field et al. 2007, Nussear 2004). As time increases from the date of translocation, most desert tortoises change their movement patterns from dispersed, random patterns to more constrained patterns, which indicate an adoption of a new home range (Nussear 2004).

We cannot predict the direction that translocated animals are likely to move. In some studies, translocated desert tortoises have exhibited a tendency to orient toward the location of their capture and attempt to move in that direction (Berry 1986), but in other instances, no discernible homing tendency has been observed in translocated animals (Field et al. 2007). Information

specific to short-distance translocations indicates that at least some individuals will attempt to return to their former home ranges after release (Stitt et al. 2003, Rakestraw 1997).

Based on the distribution of desert tortoises outside the Mojave Solar facility site, we anticipate that Abengoa is most likely to translocate desert tortoises from the edges of the solar facility site, less than 500 meters. We anticipate that these individuals are likely to move much shorter distances and remain within the maximum straight-line dispersal distance observed for male desert tortoises (1.5 kilometers) discussed above for short-distance translocations. Because of the limited resources on the site, we anticipate that any desert tortoise found on the solar facility site maintains a territory adjacent to the site and therefore is less likely to wander following translocation. However, because the action area for this project includes buffers that encompass all the contiguous desert tortoise habitat extending outside the translocation areas based on the dispersal distances predicted for desert tortoises to move following translocation, we anticipate that all translocated animals, including any that make long-distance movements, will remain in the action area. Following the first hibernation period after translocation, individuals are likely to reduce movement distances and establish new home ranges.

In one study, the majority of the dispersal movement away from the release site occurred during the first 2 weeks after translocation (Field et al. 2007). During this time and over the period prior to home range establishment, desert tortoises may experience higher potential for mortality because they are moving great distances through unfamiliar territory and are less likely to have established cover sites for protection. Desert tortoises that make long-distance movements following translocation can travel for 5 to 10 days and average 671.5 yards per day (Berry 1986). Studies have documented various sources of mortality for translocated individuals, including predation, exposure, fire, disease, crushing by cattle, and flooding (Nussear 2004, Field et al. 2007, Berry 1986, U.S. Army 2009, 2010). Of these, predation appears to be the primary source of mortality in most translocation studies (Nussear 2004, Field et al. 2007, U.S. Army 2009, 2010). Based on the description of the action area in the Environmental Baseline section of this biological opinion, the potential exists for all the sources of mortality to occur within the action area, with the exception of crushing by cattle. However, fire is likely to be localized and highly dependent on the abundance of non-native grasses and other weeds. In addition to these threats, the potential exists for desert tortoises to be killed on roads during the period when translocated individuals are seeking new home range locations. However, since most of Harper Lake Road is fenced to exclude desert tortoises and Abengoa will monitor the road during the construction of the solar facility, road kills are unlikely to occur as a result of translocation.

Abengoa has selected translocation areas in desert tortoise habitat that should serve as suitable recipient sites for these animals based on habitat suitability and proximity to home ranges of the translocated animals. It has proposed numerous protective measures in its translocation plan that are likely to reduce the potential for mortality of translocated individuals.

Studies have documented mortality rates of 0, 15, 21, and 21.4 percent of translocated animals in other areas (Nussear 2004, Cook et al. 1978 in Nussear 2004, Field et al 2007). Nussear (2004) found that mortality among translocated animals was not statistically different from mortality

observed in resident populations. This study did not compare mortality rates in resident populations to those in control groups; therefore, we cannot determine if the translocation caused increased mortality rates in the resident population. In addition, Esque et al. (2010) found that mortality rates in resident (29 of 140 desert tortoises; 20.7 percent mortality), control (28 of 149 desert tortoises; 18.8 percent mortality), and translocated populations did not differ statistically and concluded that the translocation was not the cause of the observed mortality. With the exception of the Esque et al. (2010) study, none of the studies cited in this paragraph used controls to compare mortality rates in resident and translocated populations to the mortality rate experienced in populations not affected by translocation.

Based on the information that we have gathered and considering the uncertainty of site-specific applicability, we estimate that, once moved, translocated and resident desert tortoises are likely to experience mortality rates of approximately equal proportions due to predation, exposure, fire, disease, crushing by vehicles, and flooding. Additionally, Esque et al. (2010) determined that mortality rates of translocated and resident desert tortoises are not likely to differ significantly control populations. We conclude that mortality rates in the resident and translocated populations are unlikely to be elevated above levels that these populations would experience in the absence of translocation.

Juvenile desert tortoises will comprise a portion of the overall mortality predicted above for resident and translocated populations. We anticipate that translocated juveniles are likely to experience a higher mortality rate than translocated subadult and adult desert tortoises, simply because smaller and younger desert tortoises in general have higher mortality rates than larger individuals. Because we anticipate that Abengoa will move few, if any, juvenile desert tortoises, we do not anticipate large numbers of juveniles will die as a result of translocation. We have discussed juvenile mortality during construction below. Because juvenile desert tortoises experience high mortality rates under natural circumstances, many of these individuals would likely not survive to reproductive age in the absence of project-related effects.

A limited potential exists desert tortoise eggs may be detected on the site of the proposed solar facility; if they are found, the authorized biologist would move them outside of the proposed solar site, according to current protocols. The movement of eggs poses some risk to the eggs; that is, they may not hatch as result of the movement. We have assumed that up to 29 eggs may be present on the site. If the eggs failed to survive translocation, this loss would not have an appreciable effect on desert tortoise numbers in the region in the long-term because of the relatively small number of eggs and their high natural mortality rate.

Post-translocation Monitoring

Based on the low numbers of desert tortoises expected to be found on the solar facility site, we estimate that Abengoa would attach transmitters to no more than four desert tortoises (of all sizes) to facilitate monitoring of the translocated populations. The periodic monitoring and handling of individuals with transmitters to perform visual health assessments and assess body condition may cause elevated levels of stress and render these animals more susceptible to

disease or dehydration from loss of fluids. Because Abengoa will use experienced biologists, approved by the Service, CEC and CDFG, and approved handling techniques, these desert tortoises are unlikely to experience substantially elevated stress levels resulting from handling and monitoring activities.

Construction of the Mojave Solar Facility

Because Abengoa would fence and remove all desert tortoises from the project site prior to the onset of construction, we anticipate that construction is unlikely to injure or kill subadult and adult desert tortoises on the solar facility site. Some potential always exists that surveyors may miss an individual during clearance surveys and construction monitoring. We cannot predict how many subadult and adult desert tortoises that clearance surveys and construction monitoring would miss. However, because Abengoa will use qualified biologists, authorized by the Service for clearance surveys, we anticipate the number is likely to be small.

In addition, juvenile desert tortoises and eggs are difficult to detect during clearance surveys and construction monitoring; therefore, the potential exists that surveyors may miss most of them and they are likely to remain in the work areas during construction. Construction activities are likely to kill juvenile desert tortoises and eggs that surveyors miss during clearance surveys or project monitoring. As noted in the Environmental Baseline section of this biological opinion, we are assuming that four desert tortoises and five nests may be present on site. We anticipate that construction may kill or injure any individuals and destroy any nests present, if they are not translocated from the site. Because juvenile desert tortoises and eggs experience high mortality rates under natural circumstances, many of these individuals would be unlikely to survive to reproductive age in the absence of project-related effects.

Construction of the Mojave Solar facility will increase the amount of traffic on Harper Lake Road. Although much of the road is fenced to exclude desert tortoises, gaps remain along the road to provide access to private property and utility crossings. The increased volume of vehicles along Harper Lake Road may increase the likelihood that a desert tortoise will be killed or injured by a vehicle strike; however, Abengoa should be able to reduce this threat by using a bussing service from Barstow to reduce the amount of vehicle traffic coming to the solar facility site during construction and having a biological monitor patrol Harper Lake Road when desert tortoises are active and at times of peak traffic.

The proposed speed limit of 25 miles per hour on Harper Lake Road may prevent some desert tortoises from being killed or injured. This speed is too high to allow drivers to see smaller desert tortoises; inattentive drivers are also likely to strike larger desert tortoises at this speed. In general, because most of the access route is fenced and the bussing service and patrols should reduce vehicle use and the presence of desert tortoises on the road, respectively, we expect that few desert tortoises are likely to be killed or injured on Harper Lake Road. (We note that drivers other than those associated with Abengoa will use Harper Lake Road and may be responsible for the injury and mortality of desert tortoises.)

Operations and Maintenance of the Mojave Solar Facility

Abengoa plans to conduct most operation and maintenance activities inside the desert tortoise exclusion fence over the minimum 30-year life of this project; however, Abengoa may perform some ground-disturbing maintenance activities outside of fenced areas while conducting repair of the perimeter fence. Activities associated with fence repair have the potential to injure or kill desert tortoises primarily as a result of vehicle strikes, as workers travel to and from work sites outside of the fenced areas, by workers walking the perimeter of the fence during inspections, and during repair of the perimeter fence. Additionally, if the perimeter fence is damaged, desert tortoises that enter the facility could be killed or injured during routine activities. We cannot predict how many desert tortoises might be killed or injured by such activities because we cannot predict how often the fence would require repair, whether desert tortoises would be present when the repair occurred on the fence, or if desert tortoises would enter the facility while the fence is damaged. Finally, protective measures undertaken during the repair of the fence are likely to reduce the number of desert tortoises that would otherwise be killed or injured. In general, we expect few desert tortoises to be killed or injured during operation and maintenance of the solar facility because we do not expect activities outside of the fence to occur on a frequent basis.

Accessing the Mojave Solar Facility during Operation

The access road to the Mojave Solar facility is Harper Lake Road. Although much of the road is fenced with desert tortoise exclusion fencing, gaps remain along the road to provide access to private property and utility crossings. Vehicles traveling along Harper Lake Road during operation have the potential to kill or injure desert tortoises entering the roadway. Although the CEC has required a speed limit for operations of 25 miles per hour (condition of certification BIO- 7 [CEC 2010b]), CEC may choose to modify this condition and workers may travel 55 miles per hour, which is the county-designated speed limit on Harper Lake Road. Additionally, drivers not associated with this project will be traveling the road at 55 miles per hour. Therefore, for the purpose of this analysis, we will consider the effects of the higher speed limit.

At 55 miles per hour, drivers are highly unlikely to see and avoid desert tortoises. We cannot predict how many individuals will be killed or injured because of the variables involved, such as weather conditions, the nature and condition of the road, and activity patterns of desert tortoises at the time the road is being used; however, we expect this number to be small, primarily because large portions of the road have been fenced to exclude desert tortoises. Finally, we will not be able to distinguish whether desert tortoises are killed by drivers associated with the Mojave Solar Project or others using the road.

Partial Loss of Desert Tortoise Home Ranges

Desert tortoise home ranges vary greatly in size; therefore, we cannot determine how many desert tortoises will actually lose part of their home range as a result of the construction of the Mojave Solar facility. However, given the marginal quality of desert tortoise habitat and the limited amount of desert tortoise scat and burrows observed on the Mojave Solar facility site, we

expect that desert tortoises are not using the solar facility site on a consistent basis. Therefore, we anticipate the potential partial loss of home ranges will not have a measurable effect on the desert tortoises outside of the solar facility site.

Installation of SCE's Fiber Optic Lines

Potential Injury and Mortality of Desert Tortoises

We anticipate that SCE would capture and move all subadult and adult desert tortoises from harm's way from activities associated with the installation of the fiber optic lines. Because of the difficulty in locating juvenile desert tortoises, SCE may not find all the juveniles along the fiber optic lines and thus may move some but not all juvenile desert tortoises from this area.

The installation of the 3 fiber optic line routes would cross 65 miles of desert tortoise habitat. Vehicles and workers associated with this activity have the potential to crush desert tortoises or burrows with desert tortoises or eggs inside. These effects would be most likely to occur during initial ground clearance of pole sites, staging areas, and new roads when desert tortoises are the most difficult to detect because of vegetation and other types of cover. Because SCE would affect a relatively small area (i.e., 23.11 acres) along 65 miles of transmission line, we expect that few desert tortoises would be affected by ground-disturbing activities.

Uninformed workers could also injure or kill desert tortoises intentionally or inadvertently. They may also collect desert tortoises as pets.

Vehicles traveling along right-of-way and access roads may strike desert tortoises and injure or kill them. Desert tortoises are most vulnerable at times of the year when they are most active and on roads that contain numerous rises, dips, and turns, which reduce the driver's ability to see and avoid them. Desert tortoises occasionally take shelter under parked vehicles; they can then be injured or killed when the vehicle is moved.

Existing access and right-of-way roads that are in good condition may pose a greater risk to desert tortoises because their better condition would allow vehicles to move faster; conversely, desert tortoises are more difficult to detect and avoid on roads that are in poor condition. After construction, members of the public would likely begin to use the 6.15 miles of new access road; in the long term, this use would likely have the greatest effect on desert tortoises because they would not be required to implement any of the protective measures that SCE's workers would use.

The Bureau has proposed numerous measures to avoid or reduce the number of desert tortoises that may be injured or killed by these activities. For example, when construction occurs in potentially occupied habitat, work and staging areas may be fenced with desert tortoise exclusion fence, and during all activities, all vehicles will remain on existing access and spur roads in potentially occupied habitat. SCE will use authorized desert tortoise biologists to move desert tortoises from harm's way and place them in adjacent habitat, no greater than 500 meters away.

SCE will limit vehicle speeds to 15 miles per hour to attempt to see desert tortoises that may be in the road. At this speed, workers may see larger desert tortoises but smaller animals, being less visible, will be at greater risk of being struck by vehicles; even larger desert tortoises are not visible at turns and rises in the road. Workers will be instructed to check under vehicles and, if a desert tortoise is present, to either wait until it has left of its own accord or to summon an authorized biologist to move the animal from harm's way.

SCE's proposal to work only during daylight hours (except during emergencies) would be protective of desert tortoises because they would be more difficult to detect and avoid in the dark.

Because of these reasons, we anticipate few, if any, desert tortoises are likely to be injured or killed during the installation of the fiber optic lines. Our primary reasons for reaching this conclusion are that the Bureau and SCE have proposed to undertake numerous measures to avoid or reduce the number of individuals that are injured or killed and the estimated number of desert tortoises we expect to occupy the linear areas is low.

Capture and Movement of Desert Tortoises

We cannot determine precisely how many desert tortoises along the fiber optic line will be moved from harm's way. Because a relatively small area would be disturbed by the installation of the fiber optic lines, we expect few, if any, desert tortoises or eggs will require relocating. The likelihood of encountering an animal in any particular area at any given time is low and moving any desert tortoises found the relatively short distances proposed by SCE is highly unlikely to result in measurable biological effects. These short-distance movements would likely expose the desert tortoise that is moved to other desert tortoises and habitat with which it is already familiar, because of the size of their home territories. We have provided a thorough discussion of the potential effects of moving desert tortoises in the Effects of the Translocation Strategy section of this biological opinion. We anticipate that the effect of moving any desert tortoise from harm's way along the fiber optic line installation will result in few, if any, desert tortoises being injured or killed because of the short distance individuals will be moved and because SCE will use approved handling techniques and authorized biologists approved by the Service, Bureau, and CDFG to handle the desert tortoises.

Loss of Habitat

Mojave Solar Facility

Construction of the Mojave Solar facility would cause the long-term loss of a maximum of 428.74 acres of desert tortoise habitat. The following table provides details on the habitat loss associated with the Mojave Solar facility. The remaining 1,336 acres are composed of fallow agriculture (ruderal), active agriculture, desert sink scrub, tamarisk scrub, dry lake bed, and disturbed and developed lands (CEC 2010b); none of these areas are desert tortoise habitat.

Vegetation Type	Acreage of Permanent Impacts
Disturbed–Saltbush Scrub Regrowth	223.8
Desert Saltbush Scrub	0.74
Fallow Agricultural–Saltbush Scrub Regrowth	202.9
Disturbed Desert Saltbush Scrub	1.3
Total Acreage	428.74

Fiber Optic Line Installation

Installation of the fiber optic lines would result in the loss of approximately 23.11 acres of desert tortoise habitat along the 3 routes; this total includes 11.51 acres along 32.79 miles of line that would cross critical habitat, which we discussed previously in this biological opinion, and 11.6 acres along approximately 32 miles of line within desert tortoise habitat but outside of critical habitat. For critical habitat, we determined that the disturbed areas were so small and distributed in such a linear manner that the disturbance, as a whole, did not cause a measurable effect. With the exception of the 2 new access roads, which would disturb 4.85 and 1.12 acres, the disturbance associated with the installation of the fiber optic lines also occurs in small patches in a linear distribution. Consequently, we again consider these effects to not have a measurable effect on habitat of the desert tortoise.

The loss of 5.97 acres of desert tortoise habitat for the construction of 2 new access roads may affect desert tortoise habitat by fragmenting habitat to a minor degree, introducing non-native plant species into surrounding area, and allowing for additional human access into previously undisturbed areas, which could, in turn, result in further disturbance to habitat. In this case, however, the new routes would be sited near areas that already exhibit some amount of disturbance. Consequently, the loss of approximately 5.97 acres of habitat in this area of the Western Mojave Recovery Unit will not have a substantial adverse effect on the desert tortoise.

Combined, the proposed project could result in the loss of up to 451.85 acres of desert tortoise habitat. We estimate that the Western Mojave Recovery Unit contains approximately 12,475 square miles of potential desert tortoise habitat (Waln 2011, see Status of the Desert Tortoise - Status and Trends of Desert Tortoise Populations section of this biological opinion). The habitat that would be disturbed on a long-term basis by the proposed project constitutes a small fraction of the remaining modeled habitat in the Western Mojave Recovery Unit. (I.e., 451.85 acres equals 0.71 square miles; 0.71 divided by 12,475 equals 0.00006; 0.00006 multiplied by 100 equals 0.0057 percent of the remaining modeled habitat in the Western Mojave Recovery Unit.) It is also located outside of any area that the Service considers important for the long-term conservation of the desert tortoise (i.e., critical habitat unit or desert wildlife management area) and likely linkage between such areas. Therefore, the proposed action is not likely to affect the distribution of the desert tortoise in a substantial manner.

Restoration and Reclamation Activities

The construction laydown areas required for the SCE fiber optic line installation may result in soil excavation or surface scouring in undisturbed areas supporting native vegetation. SCE will

implement several measures to restore the habitat if such disturbance occurs. Restoration activities will include stockpiling of native soil from the disturbed area and using seed from locally occurring species during planting. Stockpiling of topsoil has the potential to injure or kill desert tortoises if they or their burrows are buried by stored soil. SCE will only store soil in disturbed areas that do not provide habitat for desert tortoises and are approved by an authorized biologist. Consequently, restoration activities will likely not injure or kill any desert tortoises. Restoration personnel traveling to and from work sites may strike a desert tortoise with their vehicles; because road use related to restoration work would be relatively limited in duration, we expect that few, if any, desert tortoises would be injured or killed by these activities.

Abengoa has not proposed any restoration or reclamation activities for the Mojave Solar facility.

Miscellaneous Effects

Miscellaneous effects include increased predation by common ravens, modification of the habitat and diet of desert tortoises due to the spread of non-native plant species, and toxic chemical use during operation of the solar field.

Common ravens are attracted to human activity in the desert. Securing trash and reducing other subsidies will likely reduce the attractiveness of the solar facility to predators. Implementation of a common raven management plan for each portion of the proposed project will include active management of subsidies (e.g., evaporation ponds) associated with the solar facility and fiber optic lines. We expect that common ravens are still likely to frequent the solar facility site because it would offer perching, roosting, and nesting sites within the solar field. In addition, the new poles along the fiber optic line and the line will provide new perching and roosting opportunities. Consequently, the proposed project has the potential to attract common ravens to some degree and lead to further predation on desert tortoises in the vicinity; the proposed measures to monitor use of the site by common ravens and to attempt to remove any subsidies are likely to reduce the attractiveness of the facility to these birds to some degree.

Abengoa and SCE will contribute funds to the regional common raven management program to address the indirect and cumulative impacts associated with project development that facilitate the expansion of common raven populations into desert tortoise habitat. The one-time fee of \$105 per acre of land permanently disturbed by the solar facility site and fiber optic line installation will fund the project's portion of the regional common raven management plan for the 30-year life of the project anticipated by the DOE. Abengoa and SCE's funding of the regional management plan for common ravens will contribute to a large-scale management action that the Service and other agencies are undertaking to control and manage common ravens on a regional basis. We expect that implementation of this plan will promote the recovery of the desert tortoise by reducing the number of common ravens that prey on desert tortoises and by implementing actions that are likely to reduce subsidies for common ravens on a regional basis.

Non-native plant species currently occur on the proposed project site and are likely to occur in other portions of the action area at varying densities. Within the action area, numerous features

serve as vectors for infestation by non-native plant species (e.g., BNSF railroad, Highway 395). However, construction and operation of the Mojave Solar Project have the potential to increase the distribution and abundance of non-native species within the action area due to ground-disturbing activities that favor the establishment of non-native species. In addition, access to the project site and other project features by construction and operations personnel are likely to increase the volume and distribution of non-native seed carried into the action area. The increased abundance in non-native species associated with this project may result in an increased fire risk, which may result in future habitat loss. Abengoa and SCE have proposed numerous measures to address control of non-native plant species within the project site. We cannot reasonably predict the increase in non-native species abundance that this project will create within the action area, but we anticipate that the program proposed by Abengoa and SCE will be reasonably effective in reducing the increase in some species. However, we anticipate that the amount of disturbance created by the 1,765-acre solar field and the 85.28 miles of fiber optic line installation will result in an increase in the abundance of non-native species and thereby elevate the risk of fire, which, in turn, heightens the risk of future loss of desert tortoises and their habitat.

The Mojave Solar facility proposes to use a variety of chemicals for processing water and generating solar energy. These chemicals have the potential to adversely affect desert tortoise by decreasing their general health, reproduction and survival rate through dermal contact or via ingestion of contaminated plants, if the compounds are toxic and released from the solar facility site. The Mojave Solar facility is designed to minimize the migration of aqueous chemical compounds beyond the site perimeter and all chemical solids that need to be removed from the solar facility site will be hauled to a landfill that is authorized to receive that class of waste material. We expect that the proper handling of chemicals on the solar facility site and the design features of the solar facility will prevent any measurable effect of the facility's chemicals on desert tortoises adjacent to the solar facility site.

Summary

Abengoa and SCE will implement numerous measures to avoid, minimize, reduce, and offset the adverse effects on the desert tortoise of the proposed action. The area of the proposed solar facility site supports few, if any, desert tortoises; for the purposes of this analysis, we have assumed that four desert tortoises and five nests may occur in this area; because of the linear nature of the fiber optic lines we did not provide an estimate of desert tortoises for that portion of the project. We expect that most desert tortoises encountered during work activities will be moved relatively short distances out of harm's way at both the solar facility site and along the fiber optic lines. Abengoa will capture and translocate any desert tortoises or eggs found during construction of the Mojave Solar facility site. Because Abengoa and SCE will implement a variety of measures to reduce stress to these animals and because the animals will be released within or close to their home range, we do not anticipate that injury or mortality will result from the handling and movement of these animals.

Following release of translocated animals, we anticipate that mortality rates in the resident and translocated populations are unlikely to be elevated above normal levels. Abengoa will also assess the health of the resident desert tortoises within the buffer areas around translocated desert tortoises. We do not anticipate the handling for the purposes of health assessments or the collection of blood samples will result in substantial adverse effects because Abengoa will use experienced biologists who would be approved by the Service and approved handling techniques.

Because Abengoa will surround all of its work areas with exclusion fencing, perform clearance surveys on all work areas, and implement numerous measures to prevent injury and mortality of desert tortoises, we anticipate that construction of the Mojave Solar facility, including use of access routes, is likely to kill or injure few, if any, subadult and adult desert tortoises. Because of the difficulty detecting and removing them, we estimate that project construction may kill or injure at least some of the juvenile desert tortoises that occur on site.

Following construction, we anticipate that operations and maintenance within the permanently fenced portions of the Mojave Solar facility would kill or injure few, if any, subadult and adult desert tortoises; such events are only likely to occur in the event that a portion of the exclusion fencing is washed out and a desert tortoise gains access to the site. We anticipate that this occurrence would be rare. With the exception of activities associated with fence repair, all maintenance activities for the project site will occur within the permanent desert tortoise fencing. Because of the protective measures that Abengoa will implement and the nature of the fence repair activities, we anticipate fence maintenance activities will kill or injure few, if any, desert tortoises. Abengoa has not identified any specific maintenance activities, other than fence repair after storm events, which will be conducted outside of the desert tortoise fencing; any future activities that have not been analyzed in this biological opinion may require additional consultation. Because desert tortoise will still have access, although limited, to Harper Lake Road, some potential exists for desert tortoises to be injured or killed by personnel traveling to and from the Mojave Solar facility.

During installation of the fiber optic transmission line, desert tortoises could be injured or killed by vehicles traveling the right-of-way. Because SCE will implement numerous measures to avoid and minimize the potential for desert tortoises enter the work areas and to be crushed by vehicles, we anticipate that few, if any, desert tortoises will be injured or killed as a result of this portion of the proposed action.

Construction, operation, and maintenance of the Mojave Solar Project have the potential to increase common raven predation on desert tortoises within the action area. In addition, this project is likely to result in an increased abundance of non-native plant species and a subsequent increase in fire frequency within the action area. The measures proposed by Abengoa and SCE to address these threats will reduce the magnitude of these effects, but some level of adverse effect will likely persist. We cannot reasonably predict the number of desert tortoises that these threats will adversely affect.

The areas disturbed by the proposed solar facility site would no longer support reproduction of desert tortoises; to the best of our knowledge, desert tortoises do not currently reproduce in this area. Any desert tortoises that are moved from the site of the proposed solar field or from along the fiber optic lines would likely continue to reproduce in adjacent habitat. Consequently, we anticipate that the proposed action will not appreciably diminish the reproductive capacity of the species, particularly in light of the few desert tortoises that would be affected.

Implementation of the proposed action would not appreciably reduce the number of desert tortoises in the Western Mojave Recovery Unit. We anticipate that most of the desert tortoises encountered on this project will be moved from harm's way and placed in area within their home range. Because so few desert tortoises are likely to be affected by the proposed project (i.e., both the solar facility site and the fiber optic lines), the effect of the change in the number of individuals within the recovery unit that may result from the proposed action would not be measurable.

The distribution of the desert tortoise would be minimally reduced, as a result of the long-term disturbance associated with the proposed action (i.e., 451.85 acres). Consequently, the development of the Mojave Solar Project would result in the loss of approximately 0.0057 percent of the habitat in the Western Mojave Recovery Unit.

Given that the effects of this project on desert tortoises are not substantial, we do not anticipate that it will result in effects that appreciably reduce the current distribution, numbers, or reproduction of the overall population within the Western Mojave Recovery Unit or range wide. Taking into consideration the relative scale of the adverse effects in context with our current estimates of the species' status in the Western Mojave Recovery Unit and range wide, we do not anticipate that construction of this project would appreciably reduce the ability of the desert tortoise to survive and recover in the wild.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. According to the biological assessment, the only projects reasonably certain to occur in the action area include two road construction projects on State Route 58. Because the Federal Highway Administration has delegated the authority for consultation under section 7(a)(2) of the Act to the California Department of Transportation, the California Department of Transportation will serve as the lead Federal agency for the road projects; therefore, we are unaware of any future non-federal projects that are reasonably certain to occur on in the action area.

CONCLUSION

After reviewing its status, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the desert tortoise. We have reached this conclusion because:

1. Project activities are likely to kill or injure few desert tortoises because Abengoa and SCE will implement numerous measures to reduce the potential that desert tortoises will occupy project work sites (i.e., clearance surveys, exclusion fencing, translocation, qualified biologists, desert tortoise monitors).
2. The number of desert tortoises injured or killed as a result of translocation activities (e.g., blood tests, handling, quarantine, etc.) will be few, if any, because none were detected at the site of the proposed solar facility; any desert tortoises found onsite will be handled only by highly skilled biologists in accordance with techniques approved by the Service.
3. Post-translocation mortality in the translocated or resident populations is unlikely to be elevated above that experienced by desert tortoises not affected by translocation.
4. Abengoa and SCE will implement numerous measures to reduce the potential for increased predation by common ravens and spread of non-native plant species.
5. Regional management actions are likely to aid in reducing common raven predation of desert tortoises in a portion of the desert tortoise's range.
6. This project would not result in a substantial loss of desert tortoise habitat in areas that the Service or other agencies have designated for intensive management for the conservation of desert tortoises (e.g., desert wildlife management areas, critical habitat, etc.).

As we noted previously in this biological opinion, our analysis under section 7(a)(2) of the Endangered Species Act must be conducted in relation to the status of the entire listed taxon. We based the analysis in this biological opinion within the context of the Western Mojave Recovery Unit because of the wide range of the desert tortoise. Because we have determined that the effects of this action would not compromise the integrity of the Western Mojave Recovery Unit or impede the survival or recovery of the desert tortoise in a measurable manner in this portion of its range, we have not extended the analysis of the effects of this proposed action to the remainder of the range of the Mojave population of the desert tortoise.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of an incidental take statement.

The measures described in this document are non-discretionary. The DOE and Bureau, respectively, have a continuing duty to regulate the activities covered by the incidental take statement in this biological opinion, which are applicable to that agency's project. If the DOE or Bureau fails to include the terms and conditions of this incidental take statement as enforceable conditions of the loan guarantee or right-of-way grant, respectively, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the DOE and Bureau must report the progress of its action and its impact on the desert tortoise to the Service as specified in the incidental take statement [50 Code of Federal Regulations 402.14(i)(3)].

Translocation of Desert Tortoises from the Mojave Solar Facility

We anticipate that all desert tortoises within the site of the proposed solar facility will be taken. For the purposes of this biological opinion, we assumed that four desert tortoises and five nests are present within the solar facility.

Most of the desert tortoises within the project facility will be taken in the form of capture when they are translocated into adjacent habitat and have radio transmitters attached. We do not anticipate that the act of translocating desert tortoises is likely to kill or injure any desert tortoises. Individuals translocated greater than 500 meters will also be taken in the form of capture and harassment; the harassment would occur during the drawing of blood for disease testing. Although the drawing of blood presents some likelihood that individuals could be injured or killed, we do not anticipate that blood collection will result in the injury or mortality of any individuals; consequently, we have categorized this form of take as harassment.

The movement of five nests will involve the capture of all eggs they contain; we estimated that up to 29 eggs may be present on the site of the solar facility. Up to 29 eggs may be destroyed

(i.e., taken in the form of mortality) during their movement. We acknowledge that an egg that does not hatch after being moved may not have hatched if the nest had not been moved.

We anticipate that up to 542 resident desert tortoises within the action area of the Mojave Solar facility will be taken in the form of capture and harassment. The capture would occur during health assessments and the attachment and removal of radio transmitters. The harassment would occur during the drawing of blood for disease testing. Although the drawing of blood presents some likelihood that individuals could be injured or killed, we do not anticipate that blood collection will result in the injury or mortality of any individuals; consequently, we have categorized this form of take as harassment. We do not anticipate that the act of translocating desert tortoises is likely to kill or injure any desert tortoises.

Post-translocation Monitoring

We anticipate that four desert tortoises be taken as a result of post-translocation monitoring. These individuals will be taken in the form of capture when they are handled during the attachment and removal of transmitters and during health assessments (but not including additional drawing of blood). We do not anticipate that the attachment and removal of transmitters or additional health assessments will result in injury or mortality to desert tortoises.

Construction of the Mojave Solar Facility

We anticipate that all desert tortoises within the site of the proposed solar facility will be taken in the form of injury or mortality if they are not found during translocation and captured. For the purposes of this biological opinion, we assumed that four desert tortoises and five nests (29 eggs) are present within the solar facility.

Operations and Maintenance of the Mojave Solar Facility

We anticipate that desert tortoises will be taken in the form of capture, injury, or mortality during the operational phase of the proposed solar facility. We expect few desert tortoises will be taken during this time but cannot quantify this amount for several reasons. We cannot predict how often the fence would require repair, whether desert tortoises would be present when the repair occurred on the fence, or if desert tortoises would enter the facility while the fence is damaged. Finally, protective measures undertaken during the repair of the fence are likely to reduce the number of desert tortoises that would otherwise be killed or injured. Because we cannot quantify (i.e., predict) the amount of take associated with the operation of the solar facility, we will include a threshold for re-initiation of formal consultation for this potential source of take in the terms and conditions of this biological opinion.

Accessing the Mojave Solar Facility during Operation

We anticipate that desert tortoises will be taken by workers accessing the proposed solar facility via Harper Lake Road during its operational phase. These animals would be taken in the form of

injury or mortality, if struck by a vehicle, or in the form of capture, if they are moved from harm's way. We expect few desert tortoises will be taken during this time, primarily because most of the road has been fenced to exclude desert tortoises. We cannot quantify this amount for several reasons. Weather conditions, the nature and condition of the road, and activity patterns of desert tortoises at the time the road is being used influence the number of encounters between desert tortoises and vehicles and their outcomes (i.e., whether the desert tortoise is avoided, captured, injured, or killed). Additionally, we will not be able to distinguish whether desert tortoises are killed by drivers associated with the Mojave Solar Project or others using the road. Because we cannot quantify (i.e., predict) the amount of take associated with the operation of the solar facility, we will include a threshold for re-initiation of formal consultation for this potential source of take in the terms and conditions of this biological opinion.

Installation of SCE's Fiber Optic Lines

We anticipate that desert tortoises are likely to be taken during installation of SCE's fiber optic lines. We anticipate that most desert tortoises would be taken through capture when they are moved from harm's way; additionally, some desert tortoises are likely to be taken through injury or mortality during these activities. We expect that few desert tortoises would be taken, primarily because the proposed activities are not highly damaging to habitat and because of the location of the access roads near busy paved roads; we expect most take is likely to occur while workers are using access roads to install the fiber optic lines. We cannot quantify the amount for several reasons. Weather conditions, the nature and condition of the access road, whether desert tortoises are present when the activities occur, and the success of the protective measures influence the number of desert tortoises that will be captured, injured, and killed. Because we cannot quantify (i.e., predict) the amount of take associated with the installation of SCE's fiber optic lines, we will include a threshold for re-initiation of formal consultation for this potential source of take in the terms and conditions of this biological opinion.

We anticipate that the installation of the fiber optic lines is likely to result in the take of eggs of desert tortoises. Because of the small area that would be disturbed during this activity, we estimate that few eggs will be destroyed. We cannot estimate the number of eggs that may be taken because we do not know how many may be present during installation. Because we cannot quantify (i.e., predict) the amount of take of eggs associated with the installation of SCE's fiber optic lines, we will include a threshold for re-initiation of formal consultation for this potential source of take in the terms and conditions of this biological opinion.

Restoration and Reclamation Activities along SCE's Fiber Optic Lines

We anticipate that desert tortoises are likely to be taken during restoration and reclamation activities associated with SCE's fiber optic lines. We anticipate that most desert tortoises would be taken through capture when they are moved from harm's way; some desert tortoises are likely to be taken through mortality or injury during these activities. We expect that few desert tortoises would be taken, primarily because the proposed activities are not highly damaging to habitat and because of the location of the access roads near busy paved roads; we expect most

take is likely to occur while workers are using access roads to reach restoration sites. We cannot quantify the amount for several reasons. Weather conditions, the nature and condition of the access road, whether desert tortoises are present when the activities occur, and the success of the protective measures influence the number of desert tortoises that will be captured, injured, and killed. Because we cannot quantify (i.e., predict) the amount of take associated with SCE's restoration and reclamation activities, we will include a threshold for re-initiation of formal consultation for this potential source of take in the terms and conditions of this biological opinion.

The exemption to the prohibition against take provided by this incidental take statement applies only to activities conducted by Abengoa and SCE within the action area defined in this biological opinion.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the take of desert tortoises during the implementation of the Mojave Solar project:

1. The DOE or Abengoa, as appropriate, must ensure that desert tortoises do not enter fenced facilities at the Mojave Solar facility site.
2. The DOE, Abengoa, Bureau, and SCE, as appropriate, must ensure that the level of incidental take anticipated in this biological opinion is commensurate with the analysis contained herein.
3. The DOE or Abengoa, as appropriate, must ensure desert tortoises held in or being released from quarantine pens are not poached by humans or killed by natural predators.
4. The DOE, Abengoa, Bureau, and SCE, as appropriate, must ensure that the worker environmental awareness program includes a desert tortoise module.
5. The DOE, Abengoa, Bureau, and SCE, as appropriate, must ensure common raven use of the project components is minimized.
6. The DOE, Abengoa, Bureau, and SCE, as appropriate, must ensure that measures are taken to promote the survival of injured desert tortoises.

Our evaluation of the proposed action includes consideration of the protective measures described in the Description of the Proposed Action section of this biological opinion. Consequently, any changes in these protective measures may constitute a modification of the proposed action that causes an effect to the desert tortoise that was not considered in the biological opinion and require re-initiation of consultation, pursuant to the implementing regulations of the section 7(a)(2) of the Act (50 Code of Federal Regulations 402.16).

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Bureau, DOE, Abengoa, and SCE must comply with the following terms and conditions, which implement the reasonable and prudent measures described in the previous section, or make them enforceable conditions of the right-of-way grants or loan authorization. The Bureau, DOE, Abengoa, and SCE, as appropriate, must also fulfill the reporting and monitoring requirements. These conditions are non-discretionary.

1. The following term and condition implements reasonable and prudent measure 1:

The DOE or Abengoa, as appropriate, must monitor the effectiveness of the access gates at keeping desert tortoises out of the project site. If any desert tortoises access the site through the gates, the DOE or Abengoa, as appropriate, must contact the Service as soon as it is aware of the incident. In coordination with the Service, the DOE or Abengoa, as appropriate must implement adaptive measures to prevent further access of the solar facility site by desert tortoises. These measures may include, but are not limited to, repair of damage to the gate, redesign of the gate, and altered management of the gate.

2. The following terms and conditions implement reasonable and prudent measure 2:

- a. To ensure that the measures proposed by the DOE, Bureau, Abengoa, and SCE are effective and are being properly implemented, the DOE, Abengoa, Bureau, or SCE, as appropriate, must contact the Service immediately if it becomes aware that a desert tortoise has been killed or injured by project activities. At that time, the DOE, Abengoa, Bureau, or SCE, as appropriate, must review the circumstances surrounding the incident with the Service to determine whether additional protective measures are required. Project activities may continue during the review, provided that the proposed protective measures in the project description and any appropriate terms and conditions of this biological opinion have been and continue to be fully implemented.
- b. If two desert tortoises are injured or killed as a result of construction, operation, and maintenance of the Mojave Solar facility, consultation must be re-initiated on the proposed action, pursuant to the implementing regulations for section 7(a)(2) of the Endangered Species Act at 50 Code of Federal Regulations 402.16. This term and condition also applies to injury and mortality of desert tortoises during translocation and post-translocation monitoring of the translocated populations (i.e., due to handling, road kills, or other effects caused by personnel working on the project). However, it does not apply to post-translocation mortality within these populations that is not connected directly to an action required to carry out the translocation and monitoring effort (e.g., predation) or to injury or mortality observed along Harper Lake Road during operations and maintenance.

- c. If more than two desert tortoises per year are killed or injured on Harper Lake Road during the operation of the Mojave Solar facility, consultation must be re-initiated on the proposed action, pursuant to the implementing regulations for section 7(a)(2) of the Endangered Species Act at 50 Code of Federal Regulations 402.16.
 - d. If two desert tortoises are killed or injured as a result of installation, restoration, and reclamation activities of the SCE fiber optic lines, the Bureau must re-initiate consultation on the proposed action, pursuant to the implementing regulations for section 7(a)(2) of the Endangered Species Act at 50 Code of Federal Regulations 402.16. This term and condition also applies to restoration and reclamation work that would be conducted after installation.
3. The following terms and conditions implement reasonable and prudent measure 3:
 - a. If a desert tortoise is injured or killed by predators or if predators are observed exhibiting interest in any quarantine pens, the DOE or Abengoa, as appropriate, must immediately secure the pens from the predators that were observed or post a monitor at all times necessary to ensure that desert tortoises are not taken. Upon implementation of these measures, the DOE or Abengoa, as appropriate, must contact the Service to develop long-term measures to secure the desert tortoises from predation.
 - b. If a predator is observed being attracted to the juvenile pens, the DOE or Abengoa, as appropriate, must ensure that the desert tortoises are not released as described in the Description of the Proposed Action section of this biological opinion. The DOE or Abengoa, as appropriate, must contact the Service to develop an alternative release strategy to reduce the likelihood that juveniles will be taken.
 4. The following term and condition implement reasonable and prudent measure 4:

The DOE, Abengoa, Bureau, and SCE, as appropriate, must ensure that the worker's environmental awareness plans include a special emphasis on desert tortoises, including information on physical characteristics, distribution, behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures. The program must also include photographs of desert tortoises and their burrows.
 5. The following terms and conditions implement reasonable and prudent measure 5:
 - a. All new transmission lines associated with the Mojave Solar facility site and SCE's new fiber optic lines and new poles must be designed in a manner that will reduce the likelihood of nesting by common ravens. The DOE, Abengoa, Bureau, and SCE, as appropriate, must monitor these transmission and fiber optic lines and associated poles to ensure the effectiveness of their measures and implement adaptive management, in coordination with the Service, if the initial measures are unsuccessful. The Bureau and

SCE must ensure that any common ravens nests established on new fiber optic facilities are removed within one year when they are inactive.

- b. The DOE or Abengoa, as appropriate, must ensure that the effectiveness of its management plan at reducing subsidies for common ravens is monitored for 5 years following completion of the project. After this initial period, the DOE or Abengoa, as appropriate, must ensure that monitoring is conducted once every 5 years, unless results indicate more or less frequent monitoring is necessary.

6. The following term and condition implements reasonable and prudent measure 6:

If an injured desert tortoise is located during project construction, maintenance, or operation, the authorized biologist must assess the extent of the injuries and the potential for the desert tortoise to survive. If the authorized biologist determines that the desert tortoise would benefit from veterinary care, the desert tortoise must be taken immediately to a qualified veterinarian. If the desert tortoise is unlikely to survive, it must be humanely euthanized under the direction of or by a qualified veterinarian.

REPORTING REQUIREMENTS

Within 60 days of the construction of the proposed solar facility and installation of the fiber optic lines, the DOE, Bureau, Abengoa, or SCE, as appropriate, must provide reports to the Service that provide details on the effects of the actions on the desert tortoise; if the construction or installation require longer than a year, annual reports must be provided by December 31. The DOE or Abengoa, as appropriate, must also provide an annual report by December 31 of each year during operation and maintenance of the solar facility site. Specifically, these reports must include information on any instances when desert tortoises were killed, injured, or handled; the circumstances of such incidents; and any actions undertaken to prevent similar instances from re-occurring. In addition, these reports should provide detailed information on the results of translocation monitoring to include the following: 1) location of all translocated desert tortoises, 2) mortality rate of the population, and 3) health status and body condition of all translocated desert tortoises. The Bureau and SCE must submit the same information with regard to the fiber optic lines; this information may be included in the annual report that SCE provides with regard to its operation and maintenance work.

We recommend that the DOE and Bureau provide us with any recommendations that would facilitate the implementation of the protective measures while maintaining protection of the desert tortoise. We also request that the Bureau provide us with the names of any monitors who assisted the authorized biologist and an evaluation of the experience they gained on the project; the qualifications form on our website (http://www.fws.gov/ventura/sppinfo/protocols/deserttortoise_monitor-qualifications-statement.pdf), filled out for this project, along with any appropriate narrative would provide an

appropriate level of information. This information would provide us with additional reference material in the event these individuals are submitted as potential authorized biologists for future projects.

DISPOSITION OF DEAD OR INJURED DESERT TORTOISES

Within 3 days of locating any injured or dead desert tortoises, you must notify the Ventura Fish and Wildlife Office by telephone (805 644-1766) and by facsimile (805 644-3958) or electronic mail. The report must include the date, time, location of the carcass, a photograph, cause of death, if known, and any other pertinent information.

We will advise you on the appropriate means of disposing of the carcass when you contact us. We may advise you to provide it to a laboratory for analysis. Until we provide information on the disposition of the carcass, you must handle it such that the biological material is preserved in the best possible state for later analysis. If possible, the carcass should be kept on ice or refrigerated (not frozen) until we provide further direction.

Injured desert tortoises must be taken to a qualified veterinarian for treatment. If any injured desert tortoises survive, the Service must be contacted regarding their final disposition.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We recommend that the DOE work with Abengoa and the Service to determine if the transmitters desert tortoises can be used to answer additional research questions related to translocation or desert tortoise biology. We recommend that the Bureau and SCE retrofit the remainder of the transmission lines leading from the Mojave Solar facility to prevent common ravens from nesting on the poles. To address the indirect and cumulative effects of the installation of the fiber optic lines with regard to common ravens, we recommend that SCE contribute the appropriate additional funds to the regional common raven management program, using the formula on the Desert Managers Group web site.

The Service requests notification of the implementation of any conservation recommendations so we may be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats.

REINITIATION NOTICE

This concludes formal consultation on the DOE's proposal to issue a loan guarantee to Abengoa for the construction and operation of Mojave Solar facility and the Bureau's proposal to issue five right-of-way grants to SCE for installation of the fiber optic lines associated with the

Mojave Solar Project in San Bernardino County, California. Re-initiation of formal consultation is required where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (a) if the amount or extent of taking specified in the incidental take statement is exceeded; (b) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (c) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (d) if a new species is listed or critical habitat designated that may be affected by the identified action (50 Code of Federal Regulations 402.16).

In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) will have lapsed and any further take would be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending re-initiation.

If you have any questions regarding this biological opinion, please contact Ashleigh Blackford of my staff at (805) 644-1766, extension 234.

Sincerely,



Diane K. Noda
Field Supervisor

LITERATURE CITED

- AECOM. 2009. Common Raven Monitoring, Management and Control Plan, Mojave Solar Project, San Bernardino County, California. Prepared for Mojave Solar, LLC. San Diego, California.
- AECOM. 2010. Biological Assessment Mojave Solar Project, San Bernardino County, California. Prepared for Mojave Solar, LLC. San Diego, California.
- Avery, H.W. 1998. Nutritional ecology of the desert tortoise (*Gopherus agassizii*) in relation to cattle grazing in the Mojave Desert. Ph.D. Dissertation, Department of Biology, University of California. Los Angeles, California.
- Berry, K.H. 1986. Desert tortoise (*Gopherus agassizii*) relocation: implications of social behavior and movements. *Herpetologica* 42(1):113-125.
- Berry, K.H. 1999. Preliminary report from the 1999 spring survey of the desert tortoise long-term study plot in Chemehuevi Valley and Wash, California. Box Springs Field Station, Western Ecological Research Center, U.S. Geological Survey. Riverside, California.
- Blackford, A. 2010. Electronic mail: request for additional information. Dated November 22. Ventura Field Office, U.S. Fish and Wildlife Service. Ventura, California.
- Bureau of Land Management, County of San Bernardino, and City of Barstow. 2005. Final environmental impact report and statement for the West Mojave Plan; a habitat conservation plan and California Desert Conservation Area Plan amendment. Moreno Valley, San Bernardino, and Barstow, California.
- Burge, B.L. 1978. Physical characteristics and patterns of utilization of cover sites by *Gopherus agassizii* in southern Nevada. Proceedings of the 1978 Symposium, Desert Tortoise Council.
- Burge, B.L., and W.G. Bradley. 1976. Population density, structure and feeding habits of the desert tortoise, *Gopherus agassizii*, in a low desert study area in southern Nevada. Proceedings of the 1976 Symposium, Desert Tortoise Council.
- Burroughs, M. 2005. Electronic mail: information on recent fires in desert tortoise habitat. Dated 9 August 2005. Biologist, Fish and Wildlife Service. Las Vegas, Nevada.
- California Energy Commission. 2010a. Staff Assessment Abengoa Mojave Solar. CEC-700-2010-003. Docket Number 09-AFC-5. Dated March 2010. Sacramento, California.
- California Energy Commission. 2010b. Abengoa Mojave Solar Supplemental Staff Assessment- Part B. CEC-700-2010-003- SUPB. Docket Number 09-AFC-5. Dated May 2010. Sacramento, California.

- Circle Mountain Biological Consultants. 1996. Federal biological opinion analysis for the proposed Eagle Mountain landfill Project. Job #95-001. Prepared for CH2MHill, Santa Ana, California. Wrightwood, California.
- Clayton, C. 2005. Electronic mail: desert tortoise acres consumed by fires in 2005. Dated 11 November 2005. Biologist, U.S. Department of the Interior, Fish and Wildlife Service, Ventura Fish and Wildlife Office. Ventura, California.
- Congdon, J.D., A.E. Dunham, and R.C. Van Loben Sels. 1993. Delayed sexual maturity and demographics of Blanding's turtles (*Emydoidea blandingii*): implications for conservation and management of long-lived organisms. *Conservation Biology* 7:826-833.
- Drake, K. K., T. C. Esque, K. E. Nussear, B. M. Jacobs, K. M. Nolte, and P. A. Medica. 2009. An annual report for the Fort Irwin desert tortoise translocation project. U. S. Geological Survey, Western Ecological Research Center. Prepared for the Department of the Army. Fort Irwin, California.
- Duda, J.J., A.J. Krzysik, and J.E. Freilich. 1999. Effects of drought on desert tortoise movement and activity. *The Journal of Wildlife Management* 63:1181-1192.
- Esque, T.C., K.E. Nussear, K.K. Drake, A.D. Walde, K.H. Berry, R.C. Averill-Murray, A.P. Woodman, W.I. Boarman, P.A. Medica, J. Mack, and J.S. Heaton. 2010. Effects of subsidized predators, resource variability, and human population density on desert tortoise populations in the Mojave Desert, USA. *Endangered Species Research* (12) 167-177.
- Field, K.J., C.R. Tracy, P.A. Medica, R.W. Marlow, and P.S. Corn. 2007. Return to the wild: translocation as a tool in conservation of the desert tortoise (*Gopherus agassizii*). *Biological Conservation* 136:232-245.
- Hammel-Smith, C. 2010. Electronic mail: possible remaining issues. Dated December 7. Department of Energy. Washington, DC.
- Harless, M.L., A.D. Walde, D.K. Delaney, L.L. Pater, W.K. Hayes. 2009. Home range, spatial overlap, and burrow use of the desert tortoise in the West Mojave Desert. *Copeia* 2009:378-389.
- Hoff, K.S., and R.W. Marlow. 2002. Impacts of vehicle road traffic on desert tortoise populations with consideration of conservation of tortoise habitat in southern Nevada. *Chelonian Conservation and Biology* 4:449-456.
- Hovik, D.C., and D.B. Hardenbrook. 1989. Summer and fall activity and movements of desert tortoises in Pahrump Valley, Nevada. Abstract of paper presented at Fourteenth Annual Meeting and Symposium of the Desert Tortoise Council.

- Jennings, W.B. 1997. Habitat use and food preferences of the desert tortoise, *Gopherus agassizii*, in the western Mojave Desert and impacts of off-road vehicles. In Van Abbema, J., (Ed.). Proceedings: Conservation, restoration, and management of tortoises and turtles – an international conference. New York Turtle and Tortoise Society. Purchase, New York.
- Karl, A. 2011. Mojave Solar Project desert tortoise clearance and relocation/translocation plan. Submitted to Mojave Solar, LLC. Davis, California.
- Keith, K., K. Berry, and J. Weigand. 2005. Surveys for desert tortoises in the Jawbone-Butterbrecht Area of Critical Environmental Concern, Eastern Kern County, California. U.S. Geological Survey and Bureau of Land Management. Moreno Valley and Sacramento, California.
- Luckenbach, R.A. 1982. Ecology and management of the desert tortoise (*Gopherus agassizii*) in California. In: R.B. Bury (ed.). North American Tortoises: Conservation and Ecology. U.S. Fish and Wildlife Service, Wildlife Research Report 12. Washington, D.C.
- Natural Resources and Environmental Affairs Division. 2001. Integrated natural resources management plan and environmental assessment. Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center. Twentynine Palms, California.
- Newton, G. A., and V. P. Claassen. 2003. Rehabilitation of disturbed lands in California: A manual for decision making. California Geological Survey Special Publication 123.
- Nussear, K.E. 2004. Mechanistic investigation of the distributional limits of the desert tortoise *Gopherus agassizii*. Dissertation. University of Nevada. Reno, Nevada.
- Nussear, K.E., T.C. Esque, R.D. Inman, L. Gass, K.A. Thomas, C.S.A. Wallace, J.B. Blainey, D.M. Miller, and R.H. Webb. 2009. Modeling habitat of the desert tortoise (*Gopherus agassizii*) in the Mojave and parts of the Sonoran Deserts of California, Nevada, Utah, and Arizona. U.S. Geological Survey Open-File Report 2009-1102.
- O'Connor, M.P., L.C. Zimmerman, D.E. Ruby, S.J. Bulova, and J.R. Spotila. 1994. Home range size and movement by desert tortoises, *Gopherus agassizii*, in the eastern Mojave Desert. Herpetological Monographs 8:60-71.
- Oftedal, O.T. 2001. Low rainfall affects the nutritive quality as well as the total quantity of food available to the desert tortoise. Abstract of paper presented at the Twenty-sixth Annual Meeting and Symposium of the Desert Tortoise Council.

- Rakestraw, D.L. 1997. Desert tortoise relocation at Yucca Mountain, Nevada. Abstract of paper presented at the 1997 Annual Meeting and Symposium of the Desert Tortoise Council.
- Saethre, M.B., T.C. Esque, P.A. Medica, R. Marlow, and C.R. Tracy. 2003. Determining carrying capacity of desert tortoises. Abstract of a paper present at the 28th Annual Meeting and Symposium of the Desert Tortoise Council.
- Schamberger, M., and F.B. Turner. 1986. The application of habitat modeling to the desert tortoise (*Gopherus agassizii*). *Herpetologica* 42(1):134-138.
- Stitt, E.W., C.R. Schwalbe, D.E. Swann, R.C. Averill-Murray, and A.K. Blythe. 2003. Sonoran desert tortoise ecology and management: effects of land use change and urbanization on desert tortoises. Final report to Suaguaro National Park.
- The Nature Conservancy. 2010. Mojave Desert Conservation Value. Shape files. Mojave Desert Ecological Assessment. Dated October 13. San Diego, California.
- Tracy, C.R., R. Averill-Murray, W.I. Boarman, D. Delehanty, J. Heaton, E. McCoy, D. Morafka, K. Nussear, B. Hagerty, and P. Medica. 2004. Desert tortoise recovery plan assessment. Prepared for the U.S. Fish and Wildlife Service. Reno, Nevada.
- Turner, F.B., and D.E. Brown. 1982. Sonoran desertscrub. In: D.E. Brown (editor). *Biotic communities of the American Southwest - United States and Mexico*. *Desert Plants* 4(1-4):181-222.
- Turner, F.B., P.A. Medica, and C. Lyons. 1984. Reproduction and survival of the desert tortoise (*Scaptochelys agassizii*) in Ivanpah Valley, California. *Copeia* (4):811-820.
- Turner, F.B., K.H. Berry, D.C. Randall, and G.C. White. 1987. Population ecology of the desert tortoise at Goffs, California, 1983-1986. Report prepared for the Southern California Edison Company.
- U.S. Air Force. 2004. Integrated natural resources management plan for Edwards Air Force Base, California. Edwards Air Force Base 32-7064. September update. Edwards Air Force Base, California.
- U.S. Army. 2009. Fort Irwin annual permit report for 2008. Submitted to the Desert Tortoise Recovery Office, Reno, Nevada. Fort Irwin, California.
- U.S. Army. 2010. 2009 Annual reports for Fort Irwin biological opinions and desert tortoise permit for the Fort Irwin translocation project. Submitted to the Desert Tortoise Recovery Office, Reno, Nevada. Fort Irwin, California.

- U.S. Department of the Navy. 1995. Annual reports for desert tortoise management issues at the Naval Air Weapons Station, China Lake for 1995, 1996, 1997, 2000, 2001, 2002, 2003, 2004, 2007. China Lake, California.
- U.S. Fish and Wildlife Service. 1989a. Biological opinion for the LUZ Solar Electric Generating Systems VIII-XII at Harper Dry Lake, San Bernardino County, California (6840 (CA-932.1)). Dated October 17. Memorandum to State Director, Bureau of Land Management, Sacramento, California. Laguna Niguel, California.
- U.S. Fish and Wildlife Service. 1989b. Biological opinion for the widening of State Route 58 from Kramer Junction to Valley View Road, San Bernardino County, California (1-6-90-F-6). Dated November 22. Letter to Division Administrator, Federal Highways Administration, Sacramento, California. Laguna Niguel, California.
- U.S. Fish and Wildlife Service. 1990. Biological opinion for the Kern River Gas Transmission Company, Mojave Pipeline Company for interstate natural gas pipelines.] (1-1-87-F-36R). Dated December 21. Letter to Environmental Compliance and Projects Analysis Branch, Federal Energy Regulatory Commission, Washington, D.C. Portland, Oregon.
- U.S. Fish and Wildlife Service. 1991. Biological opinion for the proposed Kramer-Victor 220 kV transmission line project by Southern California Edison, San Bernardino County, California (CARI 310 2800 (CA-068.23)) (1-6-91-F-8). Dated January 29. Memorandum to State Director, Bureau of Land Management, Sacramento, California. Laguna Niguel, California.
- U.S. Fish and Wildlife Service. 1992a. Biological opinion for the proposed desert tortoise habitat management plan for the Naval Air Weapons Station, China Lake, California (5090 Ser 008/CO808/1309) (1-6-92-F-60). Dated December 3. Letter to Environmental Project Office, Naval Air Weapons Station, China Lake, California. Ventura, California.
- U.S. Fish and Wildlife Service. 1992b. Field survey protocol for any federal action that may occur within the range of the desert tortoise. Ventura, California.
- U.S. Fish and Wildlife Service. 1994. Desert tortoise (Mojave population) recovery plan. Portland, Oregon.
- U.S. Fish and Wildlife Service. 1995a. Biological opinion for minor electrical utility actions in Imperial, Kern, Los Angeles, Riverside, and San Bernardino Counties, California (6840 CA-063.50)(1-8-94-F-53). Dated January 13. Memorandum to State Director, Bureau of Land Management, Sacramento, California. Ventura, California.
- U.S. Fish and Wildlife Service. 1995b. Re-initiation of formal consultation for the desert tortoise habitat management plan for the Naval Air Weapons Station, China Lake, California (5090 Ser 823E00D C8305) (1-8-95-F-30R). Dated June 27. From Field

Supervisor, Ventura Field Office to Carolyn Shepherd, U.S. Navy, China Lake, California. Ventura, California.

- U.S. Fish and Wildlife Service. 1995c. Biological opinion for the ongoing maintenance activities on Southern California Gas Company's pipeline system in Southern California deserts. (6840 CA-063.50 CA-930.6) (1-8-95-F-28). Dated November 28. Memorandum to State Director, Bureau of Land Management, Sacramento, California. Ventura, California.
- U.S. Fish and Wildlife Service. 2000. Biological and conference opinion for the issuance of an incidental take permit for the High Desert Power Project and issuance of a right-of-way for a 32-mile natural gas pipeline (1-8-00-FW-17). Dated October 24. Memorandum to Deputy Manager, California/Nevada Operations and District Manager, California Desert District, Bureau of Land Management, Sacramento, California. Ventura, California.
- U.S. Fish and Wildlife Service. 2001. Biological opinion for the Southern California Gas Company pipeline expansion, line 6905 Adelanto to Kramer Junction, San Bernardino County, California (CA-680.37) (1-8-01-F-59). Dated December 7. Memorandum to District Manager, Bureau of Land Management, Riverside, California. Ventura, California.
- U.S. Fish and Wildlife Service. 2003. Biological opinion for the designation of routes of travel in the Western Mojave Desert, California (6842 CA-063.50) (1-8-03-F-21). Dated June 30. Memorandum to District Manager, California Desert District, Bureau of Land Management, Moreno Valley, California. Ventura, California.
- U.S. Fish and Wildlife Service. 2005. Guidance on conducting Endangered Species Act (ESA) section 7 consultations on the desert tortoise and other species. California Nevada Operations Office. Sacramento, California.
- U.S. Fish and Wildlife Service. 2006a. Range-wide monitoring of the Mojave population of the desert tortoise: 2001-2005 summary report. Desert Tortoise Recovery Office. Reno, Nevada.
- U.S. Fish and Wildlife Service. 2006b. Biological opinion for the California Desert Conservation Area Plan [West Mojave Plan] (6840(P) CA-063.50) (1-8-03-F-58). Dated January 9. Memorandum to District Manager, California Desert District, Bureau of Land Management, Moreno Valley, California. Ventura, California.
- U.S. Fish and Wildlife Service. 2007. Amendment to the biological opinion for the California Desert Conservation Area Plan [West Mojave Plan] (6840(P) CA-063.50) (1-8-03-F-58). Dated November 30. Memorandum to District Manager, Bureau of Land Management, Moreno Valley, California. Ventura, California.

- U.S. Fish and Wildlife Service. 2008a. Desert tortoise – authorized biologist and monitor responsibilities and qualifications.
http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt/DT%20Auth%20Bio%20qualifications%20statement%2010_20_08.pdf
- U.S. Fish and Wildlife Service. 2008b. Environmental assessment to implement a desert tortoise recovery plan task: reduce common raven predation on the desert tortoise. Ventura, California.
- U.S. Fish and Wildlife Service. 2008c. Draft revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). Sacramento, California.
- U.S. Fish and Wildlife Service. 2008d. Biological opinion for the widening of and installation of rumble strips on United States Route 395, San Bernardino County, California (Postmile 19.05-35.6, EA 0C1210) (1-8-08-F-11). Dated April 21. Letter to Environmental Planning, California Department of Transportation, San Bernardino, California. Ventura, California.
- U.S. Fish and Wildlife Service. 2009a. Desert tortoise field manual.
http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/
- U.S. Fish and Wildlife Service. 2009b. Range-wide monitoring of the Mojave population of the desert tortoise: 2007 annual report. Desert Tortoise Recovery Office. Reno, Nevada.
- U.S. Fish and Wildlife Service. 2009c. Biological opinion for the widening of United States Route 395 (Postmile 19.3 – 35.6, EA 0F630) (8-8-09-F-20). Dated July 20. Letter to Environmental Planning, California Department of Transportation, San Bernardino, California. Ventura, California.
- U.S. Fish and Wildlife Service. 2010a. Acknowledgment of request to initiate formal consultation for the Mojave Solar Project, San Bernardino County, California. Dated November 23. Ventura, California.
- U.S. Fish and Wildlife Service. 2010b. Translocation of desert tortoises (Mojave population) from project sites: plan development guidance.
http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/
- U.S. Fish and Wildlife Service. 2010c. Range-wide monitoring of the Mojave population of the desert tortoise: 2008 and 2009 annual report. Desert Tortoise Recovery Office. Reno, Nevada.
- U.S. Fish and Wildlife Service. 2010d. Range-wide monitoring of the Mojave population of the desert tortoise: 2010 annual report. Desert Tortoise Recovery Office. Reno, Nevada.

- U.S. Fish and Wildlife Service. 2010e. Revision of disease testing requirements based on translocation distance. Desert Tortoise Recovery Office. Reno, Nevada.
- U.S. Fish and Wildlife Service. 2011. Draft biological opinion on Mojave Solar, LLC's Mojave Solar Project, San Bernardino County, California (8-8-11-F-3). Letter to the Director of Environmental Compliance, Department of Energy, Loan Guarantee Program Office, Washington, D.C. and Field Manager, Bureau of Land Management, Barstow Field Office, Barstow, California. Dated March 2. From Field Supervisor, Ventura Fish and Wildlife Office. Ventura, California.
- Walde, A.D., A.P. Woodman, and W.I. Boarman. 2008. Desert tortoises surveys and research in the southern and western expansion areas of Fort Irwin. 2008 summary report. ITS Corporation. Prepared for the Department of the Army. Fort Irwin, California.
- Waln, K. 2011. GIS calculations: estimate of modeled desert tortoise habitat within the Western Mojave Recovery Unit from the 1994 recovery plan. Dated February 2. Ventura Fish and Wildlife Office, U.S. Fish and Wildlife Service. Ventura, California.
- Weinstein, M., K.H. Berry, and F.B. Turner. 1987. An analysis of habitat relationships of the desert tortoise in California. A report to Southern California Edison Company. Rosemead, California.
- Wentworth, C. 2011. Electronic mail: 395 projects. Dated February 23. California Department of Transportation. San Bernardino, California.

APPENDIX K

SAMPLE FORMS

**NON-COMPLIANCE
RESOLUTION REPORT**

MOJAVE SOLAR, LLC

MOJAVE SOLAR PROJECT

NCR Number: Date: _____ NCRR Number:

Monitor: _____ Time: _____

Describe Affected Resources: _____

Summary of Corrective Actions: _____

Conditions of Approval: _____

Approval: _____
(SIGNATURE) (NAME—PLEASE PRINT) (DATE)

NOTIFICATION FORM

MOJAVE SOLAR, LLC

MOJAVE SOLAR PROJECT

Notification Number: Date: _____ Issued to: _____

Monitor: _____ Time: _____

Station Numbers: _____ to _____ Structure Number: _____

Milepost: _____ Map Number: _____

BE AWARE THAT THE FOLLOWING PROJECT CONDITIONS (e.g., COCs, Local, State or Federal Permits) ARE NOT BEING MET:

TO FIX OR CORRECT THE CONDITION YOU MUST:

If this condition is not resolved satisfactorily by _____, a non-compliance report will be issued.

Your prompt attention to this matter is appreciated.

Notification Resolved:

(SIGNATURE)

(NAME—PLEASE PRINT)

(DATE)

NON-COMPLIANCE REPORT

MOJAVE SOLAR, LLC

MOJAVE SOLAR PROJECT

NCR Number: Date: _____ Other Parties at Site: _____

Monitor: _____ Time: _____

Station Numbers: _____ to _____ Structure Number: _____

Milepost: _____ Map Number: _____

Non-Compliance Level: Non-Compliance Stop Task Order

Land Ownership: Private Federal

In Non-Compliance With: EIS COCs State Permit Federal Permit

Mitigation Measure Number/Permit and Condition Number: _____

Describe Resource Impact (Include Resource Number): _____

Describe Activity That Resulted in Non-Compliance: _____

Documentation: Photo Video Drawing Lab Sample Other _____

Communication: Mojave Solar _____ CEC _____ BLM _____

Contractor /Operator _____ Other _____

Requirements for Resolution: _____

Resolved by: _____
(SIGNATURE) (NAME—PLEASE PRINT) (DATE)

APPENDIX L

AERIAL PHOTOGRAPHS

APPENDIX M

WILDLIFE OBSERVATION FORM

WILDLIFE OBSERVATION FORM

To Record Animals Found in Mojave Solar Project Areas

To be filled out by personnel who find active nest sites and burrows, dens and dead or injured wildlife or other biological resources during daily construction or operations activities.

Name of Employee:

Date:

Location of observation:

Wildlife species:

Condition of wildlife: Alive

Dead

Possible cause of injury or death:

Where is the animal currently?

Is the resource in danger of project (or other) impacts?

Comments:

Please contact the Designated Biologist for questions and to report any wildlife, nest, or den in the project area that could be disturbed. The Designated Biologist will advise personnel on measures required by California Department of Fish and Game and United States Fish and Wildlife Service to protect fish, wildlife, and vegetation from construction and operations impacts.

DESIGNATED BIOLOGIST

APPENDIX N
SPECIAL-STATUS SPECIES KNOWN OR POTENTIALLY
OCCURRING IN THE PROJECT AREA

APPENDIX N
SPECIAL-STATUS SPECIES KNOWN OR POTENTIALLY OCCURRING
IN THE PROJECT AREA

Table N-1
Special Status Animal Species Detected or Those Having a
Potential to Occur within the Project Area

Common Name	Sensitivity Status¹	Habitat Requirements	Probability of Occurrence
Reptiles			
Testudines (Turtles)			
Desert tortoise (DT) <i>Gopherus agassizii</i>	ESA: Threatened CESA: Threatened	Various desert scrubs and desert washes up to about 5,000 feet, but not including large, unvegetated playas.	Detected. DT individuals were not detected during 2009 surveys; however, in 2008, 35 DTs were encountered in the Survey Area, with six (6) observed on Zone of Influence (ZOI) transects for a total of 41 DT observations. No DTs were documented within the Project Area during 2007 or 2008 surveys. One female DT was observed twice near and within one of the ranches located in the Project Area during reconnaissance surveys in 2006 (EREMICO, 2006); however, this DT may have been preyed upon by dogs residing at the home as it was not seen during 2007 or 2008 surveys.
Birds			
Pelecaniformes (Tropicbirds, Pelicans, and Relatives)			
American white pelican <i>Pelecanus erythrorhynchos</i>	CDFG: Species of Special Concern	Breeds in northeastern California, winters throughout central and southern California. Rivers, lakes, estuaries, bays, marshes, nests usually in brackish or freshwater lake islands.	Detected. Remains of this species were found in August 2007, north of the Project Area within the one-mile buffer. The carcass was scavenged.
Falconiformes (Vultures, Hawks, and Falcons)			
Swainson's hawk <i>Buteo swainsoni</i>	CESA: Threatened	Migrant that breeds in North America and winters in South America. Forages in open grasslands, agricultural areas, sparse shrublands, and small open woodlands. Nests in scattered trees within grasslands, shrublands, or agricultural landscapes.	Detected. One individual of this species was observed perched within the Project Area near the southern boundary in June 2007. Two other individuals were observed soaring above the one-mile buffer in August 2007.

Common Name Scientific Name	Sensitivity Status¹	Habitat Requirements	Probability of Occurrence
Northern harrier <i>Circus cyaneus</i>	CDFG: Species of Special Concern	Occurs in grasslands and agricultural fields during migration and in winter.	Detected. Two individuals of this species were observed within the one-mile buffer, one in May 2007, and one in August 2007. This species was also detected during 2006 reconnaissance surveys (EREMICO, 2006; EDAW, 2006).
American peregrine falcon <i>Falco peregrinus anatum</i>	CESA: Endangered CDFG: Fully Protected	Open habitats from tundra, moorlands, steppe, and seacoasts to mountains, and open forested regions, especially where there are suitable nesting cliffs.	Detected. One individual of this species was observed within the Project Area perched on a utility line north of the active agricultural field in August 2007. This individual was likely a transient or at most may use the area in the vicinity of the Survey Area as a peripheral and occasional part of its home range.
Charadriiformes (Shorebirds, Gulls, and Relatives)			
Western snowy plover <i>Charadrius alexandrinus nivosus</i> *Federal listing applies only to the Pacific coastal population.	CDFG: Species of Special Concern (nesting)	Sandy beaches, dunes, and salt flats. Outside the breeding season they are more widespread.	Low potential for this species to occur. This bird was reported as occurring on the southwestern edge of Harper Dry Lake in 1978, with an estimated count of 94 birds. Most individuals appeared to be displaying nesting behavior; one nest found with three (3) eggs. Since that time, the marsh area has become degraded due to loss of artificial water inputs from agricultural operations; therefore, habitat for this species is not present, and it is not expected that this species would utilize the Project Area as habitat.
Strigiformes (Owls)			
Short-eared owl <i>Asio flammeus</i>	CDFG: Species of Special Concern	Nests in well- vegetated open areas including grasslands, grain fields, riparian edges, and marshes. Many populations of this species are migratory.	High potential for this species to occur. This species was detected within the Project Area during a reconnaissance survey conducted in 2006 (EREMICO, 2006). Suitable nesting habitat for this species occurs in the active agricultural field.
Western burrowing owl (WBO) <i>Athene cunicularia</i>	CDFG: Species of Special Concern	Found mainly in grassland and open scrub from the seashore to foothills. Strongly associated with ground squirrel burrows.	Detected. In 2008, one WBO was observed within the Project Area. Also, one owl pellet was observed in the northwestern corner of the Project Area in 2008. In 2007, a pair of WBOs was observed; however, they were not observed during 2008 surveys. An unchained domestic dog was observed within this area, so the loss of the pair may have been due to dog predation, or the WBO may have moved. A reconnaissance survey conducted in 2006 (EREMICO, 2006) resulted in

Common Name Scientific Name	Sensitivity Status ¹	Habitat Requirements	Probability of Occurrence
			detection of four (4) WBOs within the Project Area.
Passeriformes (Perching Birds)			
Yellow warbler <i>Dendroica petechia</i>	CDFG: Species of Special Concern	Breeds in mature riparian woodlands that consist of cottonwood, willow, alder, and ash trees.	Detected. This species was observed within the Project Area during May 2007 surveys. Suitable breeding habitat for this species does not occur within the Project Area or the one-mile buffer; therefore, this individual was likely a migrant and was not mapped.
Willow flycatcher <i>Empidonax traillii</i>	ESA: Endangered (only <i>E. t. extimus</i> is federally listed) CESA: Endangered	Riparian woodlands with current or evidence of recent water flow and scouring. Riparian corridors must be at least 33 feet wide, closed canopy, relatively dense understory, and open mid-story.	Detected. One individual of this species was observed using a small stand of ornamental trees within the Project Area near the southern boundary in June 2007. Suitable breeding habitat for this species does not occur within the Project Area or the one-mile buffer; therefore, this individual was likely a migrant.
Loggerhead shrike <i>Lanius ludovicianus</i>	CDFG: Species of Special Concern	Occurs in semiopen country with utility posts, wires, and trees to perch on.	Detected. Suitable habitat for loggerhead shrike occurs throughout the Survey Area. Loggerhead shrikes were observed in the Project Area during 2007 and 2009. This species was also detected during 2006 reconnaissance surveys (EREMICO, 2006; EDAW, 2006).
Mammals			
Mohave ground squirrel (MGS) <i>Spermophilus mohavensis</i>	CESA: Threatened	Mojave desert scrub, alkali scrub, and Joshua tree woodland between 1,800 and 5,000 feet. Sandy to gravelly soils.	Detected. In 2007, one MGS was trapped (one [1] adult female; age approx. one [1] year) within the Project Area at the edge of an active alfalfa field in the northeast quarter of Section 32 during a reconnaissance survey (EREMICO, 2006).
American badger <i>Taxidea taxus</i>	CDFG: Species of Special Concern	Coastal sage scrub, mixed chaparral, grassland, oak woodland, chamise chaparral, mixed conifer, pinyon-juniper, desert scrub, desert wash, montane meadow, open areas, and sandy soils.	High potential for this species to occur. A badger den was detected within the Project Area during a reconnaissance survey performed in 2006 (EREMICO, 2006).

¹ **Sensitivity Status Key**

Federal Endangered Species Act (ESA)

State California Endangered Species Act (CESA)

California Department of Fish and Game (CDFG)

**Table N-2
Special Status Plant Species Detected or Those Having a
Potential to Occur within the Project Area**

Common Name Scientific Name	Sensitivity Status¹	Habitat Requirements (CNPS, 2008)	Blooming Period	Probability of Occurrence
Chaparral sand- verbena <i>Abronia villosa</i> var. <i>aurita</i>	CNPS List 1B.1	Known to occur in chaparral, coastal scrub, and desert dunes or sandy areas.	Annual herb Blooms January through September	Low potential of occurrence within Survey Area. Chaparral sand- verbena is known to occur over five (5) miles from the Survey Area near the town of Hinkley, California (CDFG, 2008). No populations were observed in the Survey Area during 2008 botanical surveys.
Desert cymopterus <i>Cymopterus deserticola</i>	CNPS List 1B.2	Found in Joshua tree woodland and Mojave desert scrub	Perennial herb Blooms March through May	Detected within the Survey Area. One individual was detected in a small wash, south of Santa Fe Avenue, and approximately 4,350 feet southwest of the southernmost section of the Project Area.
Recurved larkspur <i>Delphinium recurvatum</i>	CNPS List 1B.2	Known to occur in chenopod scrub, cismontane woodland, and valley/foothill grassland	Perennial herb Blooms March through June	Low potential of occurrence within Survey Area. Recurved larkspur is not listed as occurring near the Survey Area using a nine-quad search centered on the Lockhart quad (CDFG, 2008). The closest occurrence of recurved larkspur (recorded in 1952) is approximately 20 miles west of the Survey Area, near the northeast corner of Edwards Airforce Base and near State Route 58. No populations were observed in the Survey Area during 2008 botanical surveys.

Common Name Scientific Name	Sensitivity Status¹	Habitat Requirements (CNPS, 2008)	Blooming Period	Probability of Occurrence
Barstow woolly sunflower <i>Eriophyllum mohavense</i>	CNPS List 1B.2	Creosote bush scrub, desert playas, and desert saltbush scrub	Annual herb Blooms March through April	Moderate to high potential of occurrence within Survey Area. Barstow woolly sunflower is known from a population just north of Harper Lake (CDFG, 2008). No populations were observed in the Survey Area during 2008 botanical surveys.
Sagebrush loeflingia <i>Loeflingia squarrosa</i> var. <i>artemisiarum</i>	CNPS List 2.2	Desert dunes, great basin scrub, and sonorant desert scrub.	Annual herb Blooms April through May	Low potential of occurrence within Survey Area. Sagebrush loeflingia is not listed as occurring near the Survey Area using a nine-quad search centered on the Lockhart quad (CDFG, 2008). No populations were observed in the Survey Area during 2008 botanical surveys.
Mojave monkeyflower <i>Mimulus mohavensis</i>	CNPS List 1B.2	Joshua tree woodland and Mojave desert scrub.	Annual herb Blooms April through June	Low potential of occurrence within Survey Area. Mojave monkeyflower is not listed as occurring near the Survey Area using a nine- quad search centered on the Lockhart quad (CDFG, 2008). No populations were observed in the Survey Area during 2008 botanical surveys.
Utah glasswort <i>Salicornia [Sarcocornia] utahensis</i>	CNPS List 2.2	Known to occur along alkali playas and marshes	Perennial succulent Blooms August through September	Moderate potential of occurrence within the Survey Area. According to information in the CNDDDB, this species was previously detected near the Rancho Percebu Duck Club Pond, west of Harper Lake (CDFG, 2008). A pickleweed species was found growing in the proximity of alkali marsh in the Survey Area, but based on rigorous field

Common Name Scientific Name	Sensitivity Status ¹	Habitat Requirements (CNPS, 2008)	Blooming Period	Probability of Occurrence
				inspection during the appropriate blooming period, it was determined that the species was annual pickleweed.

¹ **Sensitivity Status Key**

California Native Plant Society (CNPS)

List 1B.1- Plants rare, threatened, or endangered in California and elsewhere; seriously endangered in California.

List 1B.2 - Plants rare, threatened, or endangered in California and elsewhere; fairly endangered in California.

List 2.2 - Plants rare, threatened, or endangered in California, but more common elsewhere; fairly endangered in California.